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EDITED BY

T. PETCH, B.A., B.Sc.

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Revisions of Ceylon Fungi.

(PART VI.)

BY

T. PETCH, B.A., B.Sc.

THE present instalment of the Revisions of the Ceylon Fungi includes several emendations and corrections which have been made by other mycologists, more especially in the Dothideales, with further notes on these where necessary.

The duplicates of Thwaites's mycological specimens were mounted, probably in his time, on herbarium sheets, and constituted the sum total of the mycological herbarium at Peradeniya until 1905. The collection, however, was by no means complete, very many numbers being missing. In the course of overhauling an accumulation of unnamed specimens in the phanerogamic herbarium during recent years, a large number of Thwaites's specimens of fungi were found in packets, as originally placed by him, having apparently remained untouched ever since. It may be possible, from these, to supply further details concerning species the type material of which is scanty.

Further discoveries have shown that the statement made, or implied, in the first part of these Revisions, that named specimens were returned to Thwaites by Berkeley and Broome, is incorrect. Some years ago the heirs of the late W. Ferguson presented to the Royal Botanic Gardens a number of letters written by Thwaites to Ferguson, and in one of these Thwaites states, concerning his mycological collection: "The last lot goes to Berkeley by this mail, and I am putting away my own collections as fast as I can in good order for reference." Evidently Thwaites divided his specimens and kept part of each, and he followed the same course in the case of the lichens sent to Leighton, &c. The specimens at Peradeniya, therefore, are not strictly co-types, as they were not examined by the describers of the species. In actual fact they are in the

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majority of cases identical with the species under the same number at Kew; but where Berkeley and Broome divided a Thwaites's number into two or more species, these are, as a rule, mounted on the same sheet at Peradeniya.

A curious result follows, in the case of the Agaricaceæ. These were obviously described from the paintings sent, the originals of which are at Peradeniya and copies at Kew, spore details being added from the specimens. But it is quite clear, from peculiarities in form, &c., that in many cases the specimens from which the paintings were made were retained at Peradeniya. Which, then, are the type specimens?

There is yet a further ambiguity with regard to the type specimens of the Ceylon fungi. It is, I believe, generally understood that Broome furnished the microscopical details. In that case the specimens in the Broome herbarium in the British Museum would appear to have a better claim to be considered types than those in Berkeley's, at least as regards those species whose identification depends on such details. But this, again, depends on when the division of the specimens was made.

215.—Trogia infundibuliformis B. & Br.

Thwaites 685 was divided into two species, *Trogia infundibuliformis* B. & Br., and *Trogia bicolor* B. & Br. *Trogia infundibuliformis* was described as "Fuscus; pileo infundibuliformi subtiliter striato, margine acute crenato; stipite brevi, basi piloso, e strato orbiculari oriundo; venis decurrentibus, interstitiis lævibus (No. 685 in part). On dead wood and sticks. Pileus 1–1·5 inch across; edge jagged; stem 0·5–1 inch high, 1–1·5 line thick." *Trogia bicolor* was "Pileo ex infundibuliformi flabellato umbrino; stipite concolori e basi polita oriundo; hymenio pallido, venis decurrentibus (No. 685 in part). On dead wood. Pileus half an inch, or rather more, across, not striate; stem one-third of an inch high, three-quarters of a line thick, striate, springing from an orbicular polished disc, which is slightly fimbriated; veins decurrent here and there, distinctly bifid."

The type specimen of *Trogia infundibuliformis* in Herb. Kew is marked by Thwaites, "cut through vertically, and half retained by me." That would appear to indicate

Thwaites had only one specimen. But in Herb. Peradeniya there is, in addition to the other half of the Kew specimen, another complete example, as well as two specimens of *Trogia bicolor*, all on the same sheet. It would appear that Thwaites made two gatherings, the first consisting of one example only, which he divided, while the second furnished the specimens which were named *Trogia bicolor*. But he considered them the same species, and placed them on the same sheet in the Peradeniya herbarium.

Of the specimens in Herb. Peradeniya, the half and one other are dark brown, horny, and slightly translucent, with a texture resembling that of *Stereum elegans;* they are minutely striate. The other two specimens are smaller, less widely expanded, light brown, and not notably horny; the pileus is striate, when examined with a lens. It would seem probable that these are only younger specimens of *Trogia infundibuliformis*.

Trogia infundibuliformis, from fresh specimens, is entirely pale purple, or pale purple-brown, up to 4 cm. high. The pileus is deeply infundibuliform, about 3 cm. diameter, with the margin lobed and decurved, thin, rigid, and somewhat horny, minutely radially striate, with short broken striæ, becoming radially sulcate when dry. The gills are distant, sometimes forked, up to 1 mm. broad, decurrent, with an obtuse edge. The stalk is about 1·5 cm. high, and 2 mm. diameter in the middle; towards the base it expands, the base being 4 mm. in diameter, and surrounded by a white fibrillose ring, 1·5 mm. broad. The exterior of the stalk is pruinose, and its wall is horny, like the pileus; the interior is white, stuffed, becoming hollow. The wall of the stalk is a continuation of the pileus, and the hollow is filled with loose, white tissue, which ascends for a short distance over the base of the funnel; the upper surface of the pileus is not continued across the top of the stalk. There is consequently no true stalk.

216.—Hydnum polymorphum B. & Br.

Thwaites 178 was a Hydnum. Berkeley and Broome divided the specimen into two parts, one of which they named *Hydnum* (*Apus*) *polymorphum* B. & Br., and the other *Hydnum* (*Resupinati*) *versicolor* B. & Br. The specimen was

accompanied by a painting, which they assigned to the latter species. Recent specimens, however, show that the painting does not represent a resupinate species, but a full view of the under surface of a pileus.

Hydnum polymorphum was described as "Cuneiforme, e mycelio communi effuso oriundum, postice radiato-rugosum umbrinum, antice farinaceum luteum marginatum; aculeis acutis quandoque furcatis farinosis vel subgelatinosis. At first spongy, 1½–2 inches long, sometimes conchiform, sometimes forming mere thick protuberances covered on one side with prickles; hymenium yellowish, thin, rufous; mycelium resembling that of *Geaster mirabilis*."

Hydnum versicolor was "Recens nitide flavum, margine elevato albo, mycelio albo lacunoso affixum; aculeis alongatis subacutis siccis olivaceis. Five inches across; substance spongy, white."

The types of both species are in Herb. Kew. That of *H. versicolor* bears a note by Thwaites: "The whole plant when fresh of a beautiful bright yellow colour, except the growing edges, which are white." The specimens are sections of the pilei, exactly the same as the duplicates under *H. polymorphum*. The type of the latter bears a note by H. J. Banker: "These specimens are identical with *Hydnum versicolor*, and bear the same number." This determination is correct.

The fungus grows in large, imbricated plates, united behind into an irregular tuberculated mass, which may be 1 or 2 inches thick. The individual pilei are orbicular, up to 6 inches long and 8 inches broad. The upper surface is pale yellow or pale tan, minutely tomentose, the extreme upper layers being softly coriaceous, like kid leather. When old, it becomes grayish-brown. Internally the pileus is white and spongy, but strongly radially fibrillose when broken; the subhymenial layer turns purple-red when cut. The total thickness is up to 1¼ inches. The margin is obtuse and white. The hymenium is yellow to orange-yellow, becoming brown when old, with terete, blunt, close-set aculei up to 1·2 cm. long.

There is nothing on the fresh specimens, or on the Peradeniya herbarium specimen, to support the comparison with *Geaster mirabilis*.

217.—Polyporus russoceps B. & Br.

In Bull. Soc. Myc. France, XXX., p. 36, Patouillard has called attention to the fact that the pores of *Polyporus russoceps* bear cystidia, which are covered with short spines. He notes that solitary cystidia are rare, and irregularly distributed over the hymenium, but that the walls of the tubes bear minute tufts of cystidia, 30–60 μ. in diameter. The upper surface of the pileus is covered by a loose villous layer, in which larger, more spiny cystidia occur, but there are none on the edges of the dissepiments.

In the type specimens the tubes are somewhat lax, and often radially elongated, and, in drying under pressure, they have separated from one another here and there. The specimens give the impression that the hymenium is soft when fresh. In a specimen recently collected the pore surface is rigid and the pores regular, while the edges of the pores are densely covered with cystidia, and the walls of the tubes bear the same cystidia for a short distance from the mouth.

218.—Poria interrupta B. & Br.

In Fungi of Ceylon, No. 508, Berkeley and Broome described *Polyporus interruptus* B. & Br., from Thwaites 652 in part; in No. 497, they enumerated *Polyporus vaporarius* Fr. (Thwaites 367, 369), and in No. 498, *Polyporus vulgaris* Fr. (Thwaites 367, 369 in part).

In "A Preliminary List of Ceylon Polypori," Ann. Perad., VI., pp. 87–144, the writer stated that *Polyporus interruptus* and the specimens assigned to *Polyporus vulgaris* were the same species, while the specimen assigned to *Polyporus vaporarius* were re-named *Poria aquosa*.

A further study of these species has convinced me that it is not possible to keep *Poria aquosa* distinct from *Polyporus interruptus*. The form named *P. interruptus* is that which grows on decaying branches at some height, 20 feet or more, above the ground. At that height it forms small cushions with a tomentose margin, and when these cushions coalesce, the continuous sheet is interrupted by bands or areas on which the pores are not yet developed. When this form is collected on fallen branches it is usually dry, and the dissepiments are

thin and rigid. It was the latter feature which influenced the separation of *Poria aquosa*, but further specimens have shown that the dissepiments of *Polyporus interruptus* are thick and soft when moist, like those of *Poria aquosa*.

The form named *Poria aquosa* grows on rotting trunks, usually on a vertical surface. The patches are white, extending over several feet, with a thin, tomentose margin. The pores are at first soft and watery, with thick dissepiments, but they become thin and rigid on drying. When dry the pores are angular, small, and up to 2 mm. long. Frequently the patches are interrupted by small horizontal pilei. The basal layer is a thin weft of hyphæ.

This species has recently been found to cause a root disease of tea, and consequently a larger series of specimens has come under examination. On the stems of the tea bush the fructification is similar to that observed on decaying tree trunks, but there is a greater tendency to produce pilei, sometimes in imbricated masses.

On exposed lateral roots pilei are produced along the whole length, at first discontinuous, but subsequently fusing into a continuous border up to a centimetre wide. The mycelium runs freely through the soil, and produces the Poria fructification in hollows, and the pilei in imbricated masses on sloping surfaces ; it also binds together dead leaves and twigs, developing pilei along the sides of the latter, and a very elegant Poria form on the under side of the leaves. This Poria form on the dead leaves may be 3 or 4 centimetres in diameter, a very thin layer of sub-hexagonal pores surrounded by a broad, radiating, byssoid margin. When a tea bush is attacked by this fungus, the surrounding area, for a radius of about 2 feet, may be covered in wet weather by the varied fructifications.

The pilei are small, orbicular, usually about 1 cm. × 5 mm., and 2 mm. thick. The upper surface is white when dry, but appears grayish behind when moist, and is minutely tomentose.

As this species produces pilei, it must be known as *Polyporus interruptus* B. & Br., not *Poria interrupta*.

In Fungi of Ceylon No. 507, Berkeley and Broome described a species as *Polyporus niphodes*, from Thwaites 652. They stated that it resembled Hymenogramme, and superficially

it certainly does, as the pore surface seems to consist of parallel lines with anastomoses here and there.

There are several pieces of the fungus in Herb. Kew and Herb. Peradeniya. In the type in Herb. Kew the specimen is on fragments of coconut stem; it forms a thick, chalky layer, a millimetre or a millimetre and a half in thickness, which has cracked into more or less rectangular fragments, and falls away from the substratum; the surface is closely covered with minute ridges, about 0·2 mm. apart, which anastomose freely. One piece in Herb. Peradeniya is exactly the same as that in Herb. Kew, but another is somewhat different, and serves to explain the whole. The latter piece is also on coconut wood, but the wood is covered with a sandy layer up to 2·5 millimetres thick; and the fungus forms over this a very delicate basal layer, which bears short, angular pores.

There is no doubt that this last piece is a Poria, and that it is part of the same fungus on the same substratum as the other pieces. It happened to grow on a horizontal surface, but the other pieces grew on vertical surfaces, and hence their pores in an old, weathered state appear as lines.

The explanation of the peculiar characters of the specimen—its chalky nature, separability from the substratum, fragility, &c.—appears to be that it grew on coconut timber which had been used in the construction of some building, and therefore was covered with lime and mortar. The main mass of the specimens is lime or mortar; the fungus is only a thin superficial layer. The fungus is clearly *Polyporus interruptus*, as it was evidently regarded by Thwaites, for he included it with the specimens 652, to which Berkeley and Broome gave that name.

In the Fungi of Ceylon, *Polyporus niphodes* is enumerated immediately before *Polyporus interruptus*. According to the rules of priority, therefore, the former name should be employed for this species. But seeing that the description of *Polyporus niphodes* is based on a specimen which consists of a mass of lime covered with weathered effete pores, and is practically unrecognizable, it would seem more sensible to retain the name *Polyporus interruptus*.

219.—Endogone fulva (B. & Br.) Pat.

In Fungi of Ceylon, Nos. 1181 and 1182, Berkeley and Broome described two new species of Paurocotylis as *P. fulva* and *P. fragilis* respectively. Their descriptions are as follows:—

"*Paurocotylis fulva* B. & Br. Depresso-subglobosa, extus lateritiofulva, intus flava ; sporis magnis obovatis (No. 963). On the ground, Peradeniya, Jan., 1869. About half an inch across, attacked by a short, rooting, spongy mass ; spores ·003 long.

"*Paurocotylis fragilis* B. & Br. Pallide griseo-flava, fragilissima ; sporis globosis (No. 964). On the ground, Peradeniya. About a quarter of an inch across ; so fragile that it crumbles into atoms ; spores ·002 in diameter."

In Bull. Soc. Myc. France, XIX., p. 339, Patouillard recorded the results of his examination of *Paurocotylis pila* Berk. and *Paurocotylis fulva* B. & Br. He found that these two species were generically distinct. Of the latter, he stated: "Cette espece n'est en rien comparable à la précédente. Ses receptacles globuleux, fauves, de la grosseur d'un pois, tendre, dépourvus de cavité centrale, farcis de sporanges jaunes, ovoides ou presque ronds, ayant de 75 à 90 μ de diam., portés sur ses filaments larges et rameux et à contenu granuleux, la rattachent indiscutablement au genre Endogone."

The specimens of *Paurocotylis fulva* in Herb. Peradeniya (Thwaites 963) are sections of an example which was at least 15 mm. broad and 9 mm. high. A specimen recently collected is irregularly depressed-ellipsoidal, 4 cm. long, 3 cm. broad, and 2 cm. high. It was found on the surface of the ground by the side of a rotting log. When fresh it is white, with a few yellow-brown patches, becoming yellow-brown, and here and there red-brown, when dry. It has no sterile base, or internal cavities, the section showing a uniform, somewhat granular mass, pale brown in colour. The exterior is minutely tomentose, but there is no definite cortex, the outer layer being a browned zone of hyphæ and sporangia, rather more compact than the interior, to a depth of about 0·5 mm., soft and tender when fresh. The whole of the interior consists of a mass of hyphæ and sporangia or asci. The hyphæ are stout, 8–20 μ diameter, branching at a wide angle, hyaline becoming

yellow-brown, with granular contents, and filled with large brown granules when old, not septate, expanded at the axils. The sporangia, or asci, are oval, hyaline or pale yellowish, becoming pale yellow-brown, thick-walled, with granular contents, terminal, 90–120 × 64–80 μ. Thwaites's specimen agrees completely with this. It appears to be undoubtedly Endogone.

The specimen of *Endogone fragilis* in Herb. Peradeniya (Thwaites 964) is a fragment only. The denser outer layer, if ever present, has been broken off, and it is now a small crumbling mass, about 4 mm. in diameter. Its asci are chiefly subglobose, 50–64 × 48–55 μ, with some oval, 50–80 μ long, and its hyphæ are only up to 10 μ diameter. It is certainly Endogone, and probably only a young state of *Endogone fulva*

220.—Broomella niphidium (B. & Br.) Cooke.

This species, re-described in Ann. Perad., VI., p. 345, was transferred to Broomella by Cooke in Grevillea, XII., p. 105. This had been overlooked, probably because, by a printer's error, the name is there given as *Broomella nephidium*.

221.—Rhytisma maculosum B. & Br.

This was described by Berkeley and Broome from Thwaites 426, on leaves of *Sterculia* (*Pterygota*) *alata*, and Thwaites 497, on leaves of *Cansjera Rheedii*. Both collections are represented in Herb. Kew and Herb. Peradeniya. A few lines later they described *Rhytisma Pterygotæ*, on leaves of *Pterygota alata*, Peradeniya, April, 1866. Both these were transferred to *Marchalia* by Saccardo.

The Kew specimens of these two species have been examined by von Höhnel, who found that Thwaites 426 was identical with the specimen gathered in April, 1866 (Mitt. IX., pp. 48, 49; X., p. 37). He established on it a new genus, *Dothidasteroma*, with the single species *Dothidasteroma Pterygotæ*, subsequently changed, when the identity of the two species was discovered, to *Dothidasteroma maculosum*. Von Höhnel's genus is accepted by Theissen and Sydow in their revision of the Dothideales, Ann. Myc., XIII. (1915). The host plant is *Sterculia Thwaitesii* Mast.

The synonymy of the species is as follows :—

Dothidasteroma maculosum (B. & Br.) v. H., Fragm., X., No. 498 ; *Rhytisma maculosum* B. & Br., Jour. Linn. Soc., XIV., p. 130 ; *Rhytisma Pterygotæ* B. & Br., *ibid.*, p. 131 ; *Dothidasteroma Pterygotæ* (B. & Br.) v. H., Fragm., IX., No. 443 ; *Marchalia maculosa* (B. & Br.) Sacc., Syll. Fung., VIII., p. 737 ; *Marchalia Pterygotæ* (B. & Br.) Sacc., *ibid.*

The specimen on *Cansjera Rheedii* is not *Dothidasteroma*. According to von Höhnel, it bears a *Meliola*, closely allied to *Meliola amphitricha* (Fr.), and two species of *Asterina*, one with smooth spores and the other with spinulose spores. The latter has been described by him as *Asterina echinospora*, Fragm., X., No. 508.

222.—Rhytisma filicinum B. & Br.

Berkeley and Broome described this from a specimen on *Alsophila gigantea* (= *Alsophila glabra* Hk.), Thwaites 453, collected in May, 1856. It was included under *Marchalia* by Saccardo. After examination of the type in Herb. Kew, von Höhnel transferred it to *Hysterostomella*, as *H. filicina* (Fragm., No. 447). Theissen and Sydow (*loc. cit.*, p. 220) have instituted for it a new genus *Monorhizina*. It now stands as—

Monorhizina filicina (B. & Br.) Theiss. & Syd. ; *Rhytisma filicinum* B. & Br., Jour. Linn. Soc., XIV., p. 130 ; *Marchalia filicina* (B. & Br.) Sacc., Syll. Fung., VIII., p. 738 ; *Hysterostomella filicina* (B. & Br.) v. H., Fragm., IX., No. 447.

223.—Rhytisma Pongamiæ B. & Br.

Described by Berkeley and Broome from Thwaites 492, on *Pongamia glabra*, and included in Saccardo under *Cryptomyces*. It was re-described as *Phyllachora* in Ann. Perad., V., p. 291, and now stands as—

Phyllachora Pongamiæ (B. & Br.) Petch ; *Rhytisma Pongamiæ* B. & Br., Jour. Linn. Soc., XIV., p. 130 ; *Cryptomyces Pongamiæ* (B. & Br.) Sacc., Syll. Fung., VIII., p. 708.

224.—Rhytisma placenta B. & Br.

This was described by Berkeley and Broome from Thwaites 409, on leaves of *Symplocos spicata*, and Thwaites 420, on *Pavetta indica*. They stated that it was possible that the two

might be distinct species, the spores in the specimen on *Symplocos* being 30 μ long, and those of the specimen on *Pavetta* 15 μ long. In Saccardo it was listed under *Cocconia*, with a variety, *microspora*, on *Pavetta;* recent revisions have not altered that classification.

Von Höhnel, after examination of the type in Herb. Kew, stated that the spores were the same in both specimens (Fragm., No. 495), and that consequently the fungus occurs on plants which are not closely allied. Theissen and Sydow did not see the specimen on *Pavetta*. In Herb. Kew the specimen labelled " on *Pavetta indica* " is not on *Pavetta*, but on *Symplocos ;* thus, not only the fungi, as determined by von Höhnel, but also the leaves, are identical.

It may be noted that Thwaites 420 on *Pavetta indica* was included by Berkeley and Broome under *Asterina pelliculosa* (Fungi of Ceylon, No. 1140), and has been described by Theissen as *Lembosia Pavettæ* Theiss. (Ann. Myc., XI., p. 429). The spores of *Cocconia placenta* are 32–40 × 14–16 μ, and those of *Lembosia Pavettæ* are 18–21 × 6–8 μ. It would appear probable, therefore, that Berkeley and Broome's specimen of " *Cocconia placenta* " with spores half the normal size was *Lembosia Pavettæ*.

225.—Rhytisma spurcarium B. & Br.

Described from Thwaites 422, on leaves of *Artocarpus integrifolia*. On the same leaves also occurred *Rhytisma constellatum* B. & Br., which was described immediately after the former. Both were included in Saccardo under *Marchalia*, the second being the type species of the genus. Von Höhnel found that the two species were identical, and transferred it to *Hysterostomella*, as *Hysterostomella spurcaria* (B. & Br.) v. H., Fragm., IX., No. 448. Theissen and Sydow (*loc. cit.*, p. 251) amend the genus *Marchalia* and retain it for this species, but they adopt the name *Marchalia constellata*, as the latter name was placed first in the genus *Marchalia* in Saccardo. It would appear to be more correct to keep the name *Marchalia spurcaria* (B. & Br.) Sacc.

Marchalia spurcaria (B. & Br.) Sacc., Syll. Fung., VIII., p. 737 ; *Rhytisma spurcarium* B. & Br., Jour. Linn. Soc., XIV., p. 131 ; *Rhytisma constellatum* B. & Br., Jour. Linn. Soc..

XIV., p. 131; *Marchalia constellata* (B. & Br.) Sacc., Syll. Fung., VIII., p. 737; *Hysterostomella spurcaria* (B. & Br.) v. H., Fragm., IX., No. 448.

226.—Lembosia tenella Lév.

According to Theissen (Ann. Myc., XI., p. 426), the Ceylon specimens on *Eugenia* in Herb. Kew under this name are *Asterina crustosa* Berk. & Cooke. Cooke recorded the latter species for Ceylon, on leaves of *Eugenia*, in Grevillea, XXI., p. 76.

227.—Micropeltis asterophora B. & Br.

The type of this species, which was described from Thwaites 427, on *Panicum*, has been examined by von Höhnel, who finds that it is a *Trichothyrium* (Fragm., IX., No. 424; XIV., p. 9). It now stands as *Trichothyrium asterophorum* (B. & Br.) v. H.

228.—Asterina pelliculosa Berk.

This was recorded for Ceylon by Berkeley and Broome, on *Pavetta indica*, *Jasminum Sambac*, *Acrotrema*, *Rottbœllia nigricans* (error for *nigrescens*), and *Mallea Rothii*, Thwaites's numbers 421, 490, and 498 being cited. According to von Höhnel (Fragm., X., No. 515) the type specimen is probably an unripe *Microthyrium* and the Ceylon specimens are different. The specimen on *Pavetta* is Thwaites 420, and, *fide* Theissen, is *Lembosia Pavettæ* Theiss. (Ann. Myc., XI., p. 429); this is the specimen referred to by Berkeley and Broome under *Cocconia placenta*. In Ann. Myc., X., pp. 186 and 200, Theissen states that Thwaites 421, on *Ficus*, in Herb. Kew under *Asterina pelliculosa*, is *Asterina crustosa* Berk. & Cooke; and that the specimens on *Mallea Rothii* and *Melia parviflora*, also under *Asterina pelliculosa*, are *Asterina sphærotheca* K. & R. The latter is Thwaites 498; *Mallea Rothii* and *Melia parviflora* are synonyms of *Cipadessa fruticosa*.

Thwaites 490 on *Rottbœllia nigrescens*, in Herb. Peradeniya, belongs to the Dothideales. Its stromata are chiefly hypophyllous, irregularly elongated oval, up to 3 mm. long and 0·6 mm. broad. They are subcuticular, lying between the cuticle and the epidermal cells, multilocular, with globose or oval loculi, containing few asci. The upper black layer is

composed of polygonal cells, sometimes radially arranged towards the margin, and the margin is sometimes lobed. The asci are ovate, eight-spored, 38–40 × 21 μ. The spores are hyaline, oblongo-fusoid, one-septate, slightly constricted at the septum, ends rounded, minutely verrucose, 15–17 × 6–7 μ, the upper cell usually the broader. This species apparently belongs to the Munkielliæ, near *Isomunkia*, but it has no paraphyses.

The specimens on *Acrotrema* and *Jasminum Sambac* have not been found.

229.—Asterina nubecula B. & Br.

This name was published by Berkeley without description in Hooker's London Journal of Botany, VI. (1854), p. 211, but the species was not described until the publication of the Fungi of Ceylon. The type has been examined by Theissen, and re-described under the name of *Calothyrium nubecula* (B. & Br.) Theiss. (Ann. Myc., X., p. 192).

230.—Asterina Pleurostyliæ B. & Br.

The type of this species, Thw. 470, has been re-examined by von Höhnel, who finds that it is a *Meliola*, *Meliola Pleurostyliæ* (B. & Br.) v. H. (Fragm., X., No. 522). It was made the type of a new genus, *Asteridium*, by Saccardo in Syll. Fung., IX., p. 435.

In Herb. Kew there are two Ceylon specimens in the cover of *Asterina Pleurostyliæ*. One, on *Pleurostylia*, is the *Meliola ;* the other, on *Pavetta*, is *Lembosia Pavettæ* Theiss.

231.—Dothidea demersa Corda.

Under this name Berkeley and Broome placed Thwaites 464 on *Ixora parvifolia*, and Thwaites 520 on *Croton Thwaitesianum* Mull. = *Croton Klotzschianus* Thw. *Ixora parvifolia* should be *Ixora parviflora* Vahl. According to Theissen and Sydow, no type of *Dothidea demersa* Cda. exists. The specimen on *Ixora parviflora* has been named by them *Phyllachora Ixoræ* Theiss. & Syd., but they give the locality as East Indies, collected by Hobson, though they cite the number 464, which is Thwaites's (Ann. Myc., XIII., p. 553). The specimen on *Croton* in Herb. Kew is sterile, according to Theissen and

Sydow; though Berkeley and Broome's spore measurement, 10 μ, was evidently taken from it, as they state that the specimen on *Ixora parvifolia*, No. 464, differed in the shortly fusiform, granulated sporidia, 12·5–15 μ long. The corresponding specimen in Herb. Peradeniya is chiefly immature, but contains a few ripe asci, 75 × 10 μ, with elliptic, hyaline spores, 8–12 × 5–7 μ. The spores are rounded at the ends, not acute, as stated by Berkeley and Broome. This species on *Croton* appears to agree with *Phyllachora Tragiæ* (B. & C.) Sacc.

It is to be noted that the *Croton* species was also included by Berkeley and Broome under *Dothidea rhytismoides* Corda in Fungi of Ceylon, No. 1153. The Thwaites's numbers, host names, and herbarium specimens of the Ceylon Dothideales have been confused in a most bewildering fashion.

232.—Dothidea rhytismoides Corda.

Under this name Berkeley and Broome cited Thwaites 520, and 423 in part, stating that the host plant was *Hugonia Mystax* (Jour. Linn. Soc., XIV., p. 134). In the Supplement (*loc. cit.*, XV., p. 86) they again recorded *D. rhytismoides* Cda., citing Thwaites 1141. The latter specimen was subsequently transferred to *Phyllachora* by Cooke, in Grevillea, XIII., p. 63, as *Phyllachora infectoria*, on leaves of *Ficus infectoria*.

Thwaites 520 was on *Croton Klotzschianus* Thw. It had already been attributed to *Dothidea demersa* Cda. in Fungi of Ceylon, No. 1152 (see above). Thwaites 423 is on *Ficus parasitica*, and is *Dothidea microcenta* B. & Br. The specimen on *Hugonia Mystax* is Thwaites 521, a number which Berkeley and Broome did not cite. Probably 520 is an error for 521. This latter specimen has been named *Phyllachora Hugoniæ* by Theissen and Sydow (Ann. Myc., XIII., p. 512). Thwaites 1141, named *Phyllachora infectoria* by Cooke, has been transferred by Theissen and Sydow to their new genus *Catacauma*, as *Catacauma infectorium* (Cooke) Theiss. & Syd.; part of the leaf which constitutes Cooke's type specimen is included in Herb. Kew under *Phyllachora rhytismoides*.

Dothidea rhytismoides must consequently be deleted from the Ceylon list.

233.—Dothidea microcenta B. & Br.

For this species Berkeley and Broome cited Thwaites 423 in part, "on leaves apparently of Artocarpus." The co-type in Herb. Peradeniya is labelled "on *Ficus parasitica*" by Thwaites.

Cooke (Grevillea, XIII., p. 67) regarded this species as identical with *D. rhytismoides*, and, probably for that reason, *Dothidea microcenta* and *D. rhytismoides* in Herb. Kew are both in the cover of the latter. *Dothidea microcenta* was Thwaites 423, and *D. rhytismoides* 423, 521, and 499. The duplicates of 423 are labelled "on leaves of *Ficus* spp." 521 is labelled *Hugonia Mystax;* it has been referred to above. 499, on leaves of *Urostigma tomentosum* (= *Ficus tomentosa*), was regarded by Berkeley and Broome as a variety of *Dothidea aspidea*, but while the mounted specimens are in the cover of *D. aspidea*, the packet of duplicates is included under *D. rhytismoides*.

Theissen and Sydow state (Ann. Myc., XIII., p. 384) that the type of *Dothidea microcenta* (Thwaites 423) contains two species, one hypophyllous and the other epiphyllous, on separate leaves and probably different gatherings. They take the hypophyllous species as the type, which they name *Catacauma microcentum* (B. & Br.) Theiss. & Syd., and state that the epiphyllous species is hardly different from *D. aspidea* Berk. But this epiphyllous form was referred to *D. aspidea* by Berkeley and Broome; evidently this is another instance of their somewhat frequent omission to separate the specimens of their different species. In both species the host plant of Thwaites 423 is *Ficus parasitica*.

234.—Dothidea aspidea Berk.

This was originally described by Berkeley in Decades of Fungi, No. 497, as *Dothidea repens* (Corda) var. *aspidia*, "Pustulis latiusculis sparsis piceis ascis elongatis sursum attenuatis; sporidiis hyalinis subellipticis. On leaves of *Ficus repens*, Ceylon." In Fungi of Ceylon, No. 1157, Berkeley and Broome described *Dothidea aspidea* B. & Br. "Elevata, nitida, late conica, apice plerumque plana, basi margine fusco-luteo cincta; sporidiis ellipticis; spermogoniis acicularibus (No. 423 in part, 499). On *Ficus repens*, &c.,

Peradeniya, Dec., 1867: sporidia 20 μ long, spermogonia 12·5 μ long." They also included Thwaites 499, on *Urostigma tomentosum*, as a variety or a closely allied species, but made no reference to any previous publication. The species, *ex* the Fungi of Ceylon, was included in Saccardo under *Phyllachora*.

In the cover of *Phyllachora aspidea* at Kew are three collections. The earliest is marked "*Sphæria aspidea* on *Ficus repens*, Ceylon, Oct. 12, 1850" (not 1860 as cited by Theissen and Sydow); this is the type. Another collection is Thwaites 423, marked "*Dothidea aspidea* Berk. *cincta* B. & Br. var., on *Ficus*, Peradeniya, Dec., 1867." The third is Thwaites 499, marked with the same name as 423, on *Urostigma tomentosum*, Feb., 1868.

What Berkeley or Thwaites meant by *Ficus repens* is not clear. Thwaites did not include *Ficus repens* in his Enumeratio Plantarum Zeylaniæ. The "*Ficus repens*" of the Botanic Gardens is *Ficus pumila* L., but the host plant in the type of *Dothidea aspidea* is certainly not that species. The leaf is identical with that of Thwaites 423, and appears to be *Ficus parasitica*.

Theissen and Sydow state that the epiphyllous species in Thwaites 423 is scarcely different from the type, which they name *Catacauma aspideum* (Berk.) Theiss. & Syd. It is on the same host plant as the type, and is the same species. Thwaites 499 is regarded by them as a variety of *Catacauma repens* (Corda).

235.—Dothidea exsculpta Berk.

This species was described by Berkeley in Decades 499a, Hooker's Journal of Botany, VI. (1854), p. 231, from Ceylon specimens on *Agyneia multilocularis* which were said to be sterile. It was again recorded by Berkeley and Broome from Thwaites 593 on *Aporosa Lindleyana*. In Saccardo it was listed as *Phyllachora*. Cooke re-described it as *Phyllachora exsculpta* Berk., in Grevillea, XIII., p. 64, without reference to the host plant.

Theissen and Sydow (Ann. Myc., XII., p. 193) state that in Herb. Kew there are Ceylon specimens on *Aporosa Lindleyana*, *Aporosa acuminata*, *Agyneia multilocularis*, and a Phyllanthoid plant. They have re-described it as *Parmulina exsculpta* (Berk.) Theiss. & Syd.

236.—Dothidea repens Berk.

The record of this species in the Fungi of Ceylon is "*Dothidea repens* B. in Hook. Jour., 1854, p. 231. On leaves of *Ficus religiosa*, Sept. 10, 1850." But on referring to the place cited it is found that the record there is *Dothidea repens* (Corda) var. *catervaria*, on leaves of *Ficus oppositifolia* (= *Ficus hispida* L. f.).

In Herb. Kew, *sub Phyllachora repens*, there is a specimen on *Ficus religiosa*, labelled by Berkeley "*Sphæria repens* Corda, G. H. K. T., Ceylon, Sept. 10, 1850." There is no specimen marked var. *catervaria*, but in the cover of *Phyllachora catervaria* there is one marked "*Sphæria catervaria* Berk., on *Ficus oppositifolia*, Ceylon, Oct. 12, 1850."

Theissen and Sydow refer the specimen on *Ficus religiosa* to *Catacauma repens* (Corda) Theiss. & Syd., and accept that on *Ficus hispida* as *Phyllachora catervaria* (Berk.) Sacc.

237.—Dothidea graminis Fr.

Berkeley and Broome recorded this from Thwaites 468, 489, 733, and 734 in part, on *Spodiopogon*, *Ichnanthus pallens*, and *Panicum fluitans*. 468 is *Spodiopogon obliquivalvis* (= *Ischæmum ciliare*). The specimens on *Panicum fluitans* in Herb. Peradeniya are marked 509 and 733. 489 is *Ichnanthus pallens*. The citation of 734 is probably an error.

Theissen and Sydow state that *Phyllachora graminis* (Pers.) Fuck., as represented in herbaria, is a collective species, and the different forms under this name require further investigation.

38.—Dothidea stenospora B. & Br.

This was described from Thwaites 465 on *Panicum trigonum*. It was said to have narrow, subfusiform acute spores, 15 μ long. It was transferred to *Phyllachora* in Saccardo, Syll. Fung., II., p. 602.

In the cover of *Phyllachora stenospora* in Herb. Kew are Thwaites 465 on *Panicum trigonum*, Thwaites 489 on *Ichnanthus pallens*, and Thwaites 468 on *Spodiopogon* (see above). The first of these is labelled *stenospora ;* the second is labelled *Sph. graminis*, but the drawing of it is marked *stenospora ;* the third is not named. The duplicates of 468 are in the cover of *Phyllachora graminis*.

Theissen and Sydow examined only a small part of the type specimen from Herb. Kew on *Panicum trigonum*, and found that it bore a conidial fungus with hyaline, acute spores, 15–18 × 2 μ. On the part of the type examined by me the same conidial form was present, together with asci. The stromata are oval, up to 0·6 × 0·4 mm. visible on both sides of the leaf. The loculi contain hyaline, continuous conidia, which are fusoid, straight, or curved towards the ends, sometimes strongly attenuated towards one end, 18–26 × 2–2·5 μ. The asci occur in the same loculi, and are 65–75 × 6 μ, eight-spored, spores uni- or bi-seriate. The spores are hyaline, continuous, with a central gutta, narrow-oval, ends acute, 13–14 × 3·5–4 μ. This is evidently a *Phyllachora*, and will stand as *Phyllachora stenospora* (B. & Br.) Sacc.

239.—Dothidea Osbeckiæ B. & Br.

This was enumerated in Saccardo, Syll. Fung., II., p. 633, as *Dothidella*. Theissen and Sydow (Ann. Myc., XII., p. 192) have re-described it as *Rehmiodothis Osbeckiæ* (B. & Br.) Theiss. & Syd.

240.—Dothidea Elettariæ B. & Br.

In Saccardo, Syll. Fung., II., p. 633, this was listed as *Dothidella*. Theissen and Sydow (Ann. Myc., XIII., p. 408) have re-described it as *Placostroma Elettariæ* (B. & Br.) Theiss. & Syd. It occurs on *Amomum floribundum* Tr. = *Elettaria floribunda* Thw.

241.—Dothidea incarcerata Berk.

This was described by Berkeley in Hooker's Journal of Botany, VI. (1854), p. 232. It occurred on leaves of *Uvaria*, *Guatteria*, and other Anonaceæ. Berkeley stated that specimens had been distributed under the name of *Sph. Guatteriæ*, in the belief that they were distinct from those on *Uvaria*, but further examination had forced him to unite them. Cooke, on finding the specimen marked *Sphæria Guatteriæ* in Berkeley's herbarium, published a description of it under the name of *Phyllachora Guatteriæ* Berk.

The specimens in Herb. Kew, in the cover of *Phyllachora incarcerata* (Berk.) Sacc., include one, October 12, 1850, labelled by Berkeley "*Dothidea incarcerata* Berk. (*Sphæria*

Guatteriæ Berk.)" ; another labelled "*Dothidea incarcerata*, Berk. *Sphæria* (*confertæ*) *Annonaceæ* Berk. *in Annonaceam*, Ceylon" ; and a third, labelled "*Dothidea incarcerata* Berk. Ceylon, 1850. G. H. K. T. *In Uvariam*." The cover of *Phyllachora Guatteriæ* Cooke contains a specimen marked by Berkeley "*Sphæria Guatteriæ* Berk. Ceylon."

The species, *fide* Theissen and Sydow, stands as *Phyllachora incarcerata* (Berk.) Sacc.

242.—Dothidea Tetrantheræ B. & Br.

In Hooker's Journal of Botany, VI. (1854), p. 232, Berkeley, after describing *Dothidea repens* var. *aspidia*, stated that a form occurred in Ceylon on *Tetranthera tomentosa* which he would willingly unite with the former ; he had distributed it under the name of *Sphæria Tetrantheræ*.

In the Fungi of Ceylon, No. 1162, Berkeley and Broome described *Dothidea Tetrantheræ* B. & Br., on *Tetranthera Roxburghii* and *T. tomentosa*, citing Thwaites 442. This number was collected in December, 1867, and is on *T. Roxburghii ;* the specimen on *T. tomentosa* was collected October 12, 1850. In Herb. Peradeniya the co-type is marked 442 and 528, all the leaves being *T. Roxburghii*. *Tetranthera Roxburghii* Nees = *Litsea chinensis* Lam., and *T. tomentosa* Roxb. = *Litsea tomentosa* Heyne. The species was transferred to *Phyllachora* in Saccardo, Syll. Fung., II., p. 595, and Theissen and Sydow agree with that determination. It consequently stands as *Phyllachora Tetrantheræ* (B. & Br.) Sacc.

243.—Dothidea Thwaitesii Berk.

This was described by Berkeley in Decades of Fungi, No. 500, on leaves of a Cyperad. In the Fungi of Ceylon, No. 1163, the record was repeated, but the host plant was given as *Ficus oppositifolia*. The species on *Ficus oppositifolia*, described in Decades No. 497, was *Dothidea repens* var. *catervaria*, which was not included in the Fungi of Ceylon. It is evident that, by an error in compilation or printing, two lines have been omitted on page 135, Jour. Linn. Soc., XIV., viz., that giving the correct host of *Dothidea Thwaitesii*, and that containing the name *Dothidea catervaria*.

The species was included in Saccardo, Syll. Fung., II., p. 598, as *Phyllachora Thwaitesii* (Berk.) Sacc., a determination which Theissen and Sydow confirm.

244.—Dothidea perisporioides B. & C.

Thwaites 444, 456, and 494 were referred to this species by Berkeley and Broome, the host plant being given as *Desmodium triflorum*. They also recorded for Ceylon, *Dothidea grammodes* Kze., on *Crotalaria verrucosa* and on *Indigofera flaccida* (= *I. subulata* Poir.). But the three Thwaites's numbers, cited as *Dothidea perisporioides*, refer to the three different hosts, one of which is recorded under *D. perisporioides*, and the other two under *D. grammodes*. The fungi on the three plants in Herb. Peradeniya are all *Parodiella perisporioides* (B. & C.) Speg.

245.—Dothidea edax B. & Br.

This was included in Saccardo, Syll. Fung., II., p. 563, as *Ophiodothis*. It has been transferred by von Höhnel (Fragm., XII., p. 57) to *Ophiodothella*, as *Ophiodothella edax* (B. & Br.) v. H. It occurred on *Tephrosia suberosa* Benth.

246.—Dothidea phaselina Mont.

Berkeley and Broome recorded this species from Ceylon on bamboo. The original name was *Sphæria phaselina* Mont., Syll. Crypt., No. 855. It was included in Saccardo, Syll. Fung., I., p. 179, as *Eutypa phaselina* (Mont.) Sacc., and has been figured by Berlese in Icones Fungorum, III., tab. 59, fig. 2. The Ceylon specimen appears to be correctly identified. Berlese suggested that the type is on the petiole of a palm, but the Ceylon specimen is on bamboo.

247.—Dothidea Calophylli B. & Br.

This was described by Berkeley and Broome in Fungi of Ceylon, No. 1171, from Thwaites 590, as "Hysteriiformis, emergens, ostiolis latitantibus; ascis clavatis; paraphysibus linearibus; sporidiis sigmoideis angustis, uniseptatis. On leaves of *Calophyllum Walkeri*. Nuwara Eliya, 7,000 feet, April, 1868. Asci ·0035 long by ·0005; sporida ·0015–·002 long by ·00025." The measurements are, as usual, in inches.

Saccardo, Syll. Fung., II., p. 635, placed this species in *Scirrhia*, and was followed by Cooke in Grevillea, XIII., p. 72. Theissen and Sydow (Ann. Myc., XIII., p. 417) have examined the type specimen in Herb. Kew, and state that it cannot be determined with certainty as the specimens are scanty and effete. They describe the stromata as elongated, dull black, 1·5–2·5 mm. long, 0·5 mm. broad, pulvinately projecting, irregularly linear, running in the direction of the lateral nerves of the leaf, immersed in the mesophyll, constantly accompanied by an alga colony embedded beneath the cuticle, which at first covers the stroma, but afterwards splits. Asci were not seen. They state that the paraphyses (as described by Berkeley and Broome) and the position of the stroma in the mesophyll exclude the species from the genus *Scirrhia*, and suggest that it should be included in the lichens, though the loculi are dothideoid.

There is an abundance of specimens in the co-type in Herb. Peradeniya, and some contain mature asci. The stromata are chiefly hypophyllous, but may appear on the upper surface also, exactly over those on the lower. They are usually elongated, pulvinate, up to 2·5 mm. long, and 0·5 mm. broad, erumpent, rupturing the epidermis longitudinally with a single split (Berkeley and Broome's "Hysteriiformis"); but they may be irregularly oval, and in that case the epidermis may be broken in several places, in either straight or curved lines or pierced with minute circular holes. The stromata are formed in the mesophyll, and are composed of more or less parallel, dark brown hyphæ, except round the loculi, where the structure is parenchymatous, and the tissue lining the loculus is hyaline. When a stroma is present on both surfaces, the two are united internally by a loose web of brown hyphæ passing between the central mesophyll cells. The growth of the stroma ruptures the over-lying epidermis, the upturned edges of which border and partly cover the fungus. There is no epidermal clypeus. The loculi are usually distant, oval or circular in cross section and oval in longitudinal section, up to 170 μ deep, and 100 μ diameter; they are generally arranged in two rows, either closely approximated, or separating in the centre, according to the shape of the stroma; they have separate

ostiola, which are furnished with periphyses. The asci arise from the base of the loculus; they are clavate, very shortly pedicellate, thick-walled, the apex up to 12 μ thick, eight-spored, with the spores four-seriate, 75–90 × 16 μ. The spores are hyaline, narrow-fusoid, slightly curved, one-septate, not constricted, 43–56 × 3–4 μ. From the holes in some of the leaves, it would appear that the stromata ultimately fall out.

I have not been able to find the paraphyses recorded by Berkeley and Broome. Nor is it possible to confirm Theissen and Sydow's statement that the stroma is covered by an alga layer, embedded beneath the cuticle. Some alga cells are present on the exposed part of the stroma, but they do not appear to extend beneath the cuticle, and they are not present on the young stroma, which, indeed, develops in the mesophyll below the epidermis. In the case of a coriaceous leaf like that of *Calophyllum Walkeri*, grown in a very moist climate, it is not exceptional to find algæ in cracks in the leaf or distributed over its surface. Indeed, it may be regarded as the rule rather than the exception. This species would appear to agree with *Dothidella*, and will stand as *Dothidella Calophylli* (B. & Br.).

248.—Dothidea dolichogena B. & Br.

This was included in Saccardo, Syll. Fung., II., p. 601, as *Phyllachora dolichogena* (B. & Br.) Sacc. Theissen and Sydow confirm this. The specimen was said to be on leaves of *Dolichos*, but it may be noted that Thwaites queried that identification of the host on the co-type in Herb. Peradeniya.

249.—Dothidea calamigena B. & Br.

Saccardo, Syll. Fung., II., p. 606, placed this species in *Phyllachora*. Theissen and Sydow have re-described it, from the type specimen, as *Phæochora calamigena* (B. & Br.) Theiss. & Syd. It occurred on *Calamus rudentum* Moon = *Calamus zeylanicus* Becc.

250.—Dothidea filicina Mont.

In Decades of Fungi, No. 499 (Hooker's Journal of Botany, VI. (1854), p. 232), Berkeley described a Ceylon specimen as *Dothidea filicina* Mont. MSS., var. *nerviseqvia*, on the underside of fern leaves. In the Fungi of Ceylon, No. 1170, the record appears as "*Dothidea filicina* Mont. On leaves of ferns,

1851." In Saccardo, Syll. Fung., II., p. 632, it is listed as *Dothidella nervisequia* (Berk.) Sacc. Theissen and Sydow have transferred it to *Monorhiza*, as *Monorhiza nervisequia* (Berk.) Theiss. & Syd.

251.—Dothidea Barringtoniæ B. & Br.

The type specimen of this, on *Barringtonia speciosa*, was said to be immature by Berkeley and Broome. Cooke, in Grevillea, XIII., p. 41, stated that the specimen bore small ostiolata perithecia without fruit, which were probably those of a *Phoma*. Subsequently, in Grevillea, XVII., p. 79, Cooke and Massee described *Phoma Barringtoniæ* Cke. & Mass., on living leaves of *Barringtonia speciosa*, Kew, in a list of new British Fungi. Their description was " Epiphyllous, on large, irregular, glaucous spots. Perithecia convex, papillate, subgregarious, black, covered with the thin shining cuticle. Sporules fusoid-elliptic, with a nucleus at each end, continuous, hyaline, 13–15 × 4–5 μ."

Berkeley and Broome's description of *Dothidea Barringtoniæ* is " Cellulis radiantibus, in maculis latis orbicularibus dispositis, minutis, apice niveis. On leaves of *Barringtonia speciosa*. Botanic Garden, Peradeniya, Oct., 1864. Unfortunately there is no fruit : but the production is too remarkable to pass it by altogether. It has at first sight the appearance of an *Asteroma*." By " cellulis," Berkeley and Broome meant pycnidiis.

The type of *Phoma Barringtoniæ* Cke. & Mass. in Herb. Kew is identical with *Dothidea Barringtoniæ* B. & Br., and it would appear that it is part of the latter specimen, not a British fungus collected at Kew.

The fungus forms large spots up to 7 cm. diameter, usually semicircular, and extending from the margin of the leaf ; they are gray, obscurely zoned with pale brown, with an olive margin. The pycnidia are epiphyllous, scattered, subepidermal, prominent, forming minute black points, usually arranged more or less in concentric lines. Each point is tipped with white, owing to the rupture of the epidermis over the ostiolum. The pycnidia are globose, about 150 μ diameter, with a well-defined circular ostiolum, 10 μ diameter. The sporidia are narrow-oval, with obtuse ends, greenish hyaline, continuous, 12–16 × 5–7 μ.

The synonymy is—

Phoma Barringtoniæ (B. & Br.) Cke. & Mass.; *Dothidea Barringtoniæ* B. & Br.; *Phyllachora Barringtoniæ* (B. & Br.) Sacc.

252.—Meliola mollis B. & Br.

This species was described by Berkeley and Broome in Fungi of Ceylon, No. 1178, as having minute conidia 3·75 μ long, and one-septate ascospores, 20 × 10 μ. They gave figures of the spores. In Saccardo, Syll. Fung., I., p. 53, it was placed in *Dimerosporium*. The type specimen has been examined by von Höhnel, who finds (Fragm., X., No. 524) that it is a mixture, containing the following species :—

(1) A *Didymosporium* (?) with two-celled, violet, narrow-cylindric spores, 24 × 8–10 μ. These spores were taken to be the ascospores of the *Meliola* by Berkeley and Broome.

(2) A dothidaceous species (? *Rousseauella*) with cylindrical asci, containing elliptic spores, 20 × 10 μ. This is the ascus figured by Berkeley and Broome.

(3) A *Meliola*, with three-septate spores, 56–64 × 12–13 μ. Von Höhnel adopts the name *Meliola mollis* (B. & Br.) v. H. for the *Meliola*. It is on *Syzygium Jambolanum* DC. = *Eugenia Jambolana* Lam.

253.—Pisomyxa Amomi B. & Br.

This species has been re-described by von Höhnel (Fragm., VIII., No. 367), who has instituted for it a new genus, *Dimerosporiella*. This generic name, however, is ante-dated by *Dimerosporiella* Speg., Fungi Aliquot Paulistani, 1908, p. 11, *vide* Ann. Myc., VII., p. 557.

254.—Metasphæria plegmariæ (Ces.) Sacc.

This species was collected in Ceylon by Beccari and described by Cesati as *Sphærella plegmariæ*. In Saccardo, II., 183, it was transferred to Metasphæria.

Cesati's description is "Perithecia foliicola, sparsa, epi- et hypophylla, epidermide tecta, depresso-globosa, contextu vesiculoso. Sporidia fusoidea, curvula, obtusa, hyalina, triseptata, 10–11 × 2·5. Ad folia Lycopodii Plegmariæ." The

description has been copied into Saccardo as it stands, but Cesati's unit of spore measurement was 2 μ, and consequently the dimensions of the spores should be 20–22 × 5 μ.

This species has been re-discovered on leaves of *Lycopodium phlegmaria* at Hakgala. The perithecia are chiefly epiphyllous, immersed, black, depressed globose, 0·3 mm. diameter, with slightly projecting ostiola. By transmitted light the perithecial wall is rather pale brown, except at the ostiolum, which is black. The asci are narrow-clavate, almost sessile, without paraphyses, eight-spored, about 90 × 8 μ. The spores are narrow-oval or fusoid, straight, ends acute, hyaline, three-septate, not constricted at the septa, 16–24 × 4–6 μ.

255.—Clypeolum zeylanicum Cke. & Mass.

This species was described by Cooke and Massee in Grevillea, XVII., p. 43, from Ceylon specimens, as " Peritheciis sparsis, superficialibus, dimidiato-scutatis, atris, nitidis (¼ mm. diam.), macula nulla vel macula brunnea indeterminata, insidentibus. Ascis clavatis. Sporidiis ellipticis, uniseptatis, hyalinis, 11 × 3 μ." In Grevillea, XVIII., p. 35, they stated that it occurred also on leaves from Brazil (Glaziou 18070, 18084, 18078).

The Ceylon specimen in Herb. Kew bears a label marked Ceylon in Berkeley's handwriting, and the locality " Padacumbra " in pencil. There is no date or name of the host plant.

The perithecia are situated on the upper side of the leaf in blackish patches up to 5 mm. diameter. These patches are superficial films, formed by rays, which start from a central point, branching and expanding as they run outwards, and ultimately coalescing into a more or less continuous patch. The arrangement resembles that of Cephaleuros. The rays are pale brown, blackening at the margins. The perithecia are embedded in the film ; they are black, up to 0·5 mm. diameter, smooth, peltate, broadly conical, superficial, with a thick, opaque, carbonaceous wall, in which the structure is not evident. The asci are narrow-clavate, 30 × 4 μ. The spores are hyaline, fusoid, one-septate, 12–14 × 3 μ.

The structure of the film does not agree with that of the Trichopeltaceæ. It would appear that *Clypeolum zeylanicum* should be classed as a lichen.

256.—Botryosphæria inflata Cke. & Mass.

Thwaites 542 was left undescribed by Berkeley and Broome, and was subsequently named *Botryosphæria inflata* by Cooke and Massee in Grevillea, XVII., p. 42. Their description is "Peritheciis cortice interiore nidulantibus, demum rimoso-erumpentibus, papillatis, glabris, atris, contextu coriaceo; rimis arcte conniventibus, graphideis, flexuosis; ascis clavatis, octosporis. Sporidiis biserialibus, ellipticis, utrinque obtusis, medio inflatis, continuis, hyalinis, 33–35 × 10 μ."

The specimens are somewhat peculiar, in that the pieces of bark are covered by a thin, compact, grayish-white film. This is a layer of fungus hyphæ, and, judging from some specimens of a scale insect embedded in it, may be an immature Septobasidium. It is not connected with the Botryosphæria, but may account for Cooke and Massee's "rimis graphideis." The stromata are immersed in the cortex, circular or oval in plan, up to 0·8 mm. diameter, only slightly erumpent, raising and cracking the outer cortical layers, usually in narrow, linear cracks. The stromata are black, with slightly projecting ostiola, parenchymatous. The perithecial cavities are scattered or crowded, up to 0·3 mm. diameter. The asci are clavate, thick-walled at first, with biseriate spores, the sporiferous part measuring about 30 × 16 μ. Numerous paraphyses are present. The spores are narrow-oval to lanceolate, ends obtuse, hyaline, 20–30 × 6–8 μ. They appear to be somewhat immature, and are not more inflated in the middle than spores of this type so often are.

In a recent collection, on *Cedrela toona*, the spores are 18–25 × 6–8 μ.

257.—Physalospora asbolæ Cooke.

Part of Thwaites 307 was marked *Sphæria asbolæ* by Berkeley, but he did not publish the name, probably because the specimen is in such bad condition that a definite determination is impossible. Cooke discovered it in Berkeley's herbarium, and published a description as *Physalospora asbolæ* B. & Br. in herb. (Grevillea, XX., p. 82). He gave the spore as 18–20 × 10 μ. I was unable to obtain anything determinable from

the perithecia ; they are effete, and in some cases are filled with brown hyphæ, suggestive of Diplodia.

Another part of Thwaites 307, in Herb. Kew, was also named by Berkeley, without publication. As, however, the specific name is indecipherable, Cooke did not " re-describe " it.

258.—Tryblidiella Leprieurii (Mont.) Sacc.

This was recorded for Ceylon by Berkeley and Broome in Fungi of Ceylon, No. 1148, as *Angelina Leprieurii* Mont., from Thwaites 6, 362, and 1066. They gave the spores as 30–37·5 × 12·5 μ, and stated that they varied in size.

In " Mycetum in itinere Borneensi lectorum," Cesati described *Angelina Beccariana* Ces., collected in Ceylon by Beccari. The spores were said to be 12–15 × 5–6, but as Cesati's unit is 2 μ, this measurement is 24–30 × 10–12 μ.

Thwaites 362 in Herb. Peradeniya has spores 20–30 × 8–9 μ. Cesati's specimen of *Tryblidiella Beccariana* (Ces.) Sacc., in Herb. Kew, has spores 30–34 × 9–12 μ. Recent collections of Tryblidiella include gatherings with spores 32–34 × 9–11 μ, 24–30 × 8–10 μ, and 20–24 × 6–8 μ. These appear to be all the same species, and it is not possible to separate *T. Beccariana* on spore dimensions.

The asci of the small-spored form measured 160 × 9 μ ; in other forms they reach 260 × 12 μ. The disc is usually reddish-brown to olive, but in one gathering it was greenish-yellow.

259.—Aulographum intricatum B. & Br.

Thwaites 1226, on Pandanus, was described by Berkeley and Broome as " *Ailographum intricatum* B. & Br. Lirellis intricatis reticulatis, in maculis orbicularibus serius confluentibus dispositis." It has apparently escaped revision.

The leaf bears blackish cloudy patches, formed by somewhat distant, closely adherent, repent hyphæ. The perithecia are borne on these patches, and are rather crowded, superficial, linear, straight or slightly flexuose, sometimes forked towards one end, up to 1·5 mm. long, 0·2 mm. broad, subtriangular in section, with the apex subacute and the sides vertically ridged.

The specimen is almost entirely effete ; the few ripe spores observed are brown, broadly oval or subcymbiform, with rounded ends, one-septate, constricted at the septum, 30–32 × 12–14 μ.

This species is evidently *Lembosia*, and will stand as *Lembosia intricata* (B. & Br.).

260.—Lophodermium Fourcroyæ (B. & Br.) Massee.

This species was described by Berkeley and Broome as *Hysterium Fourcroyæ*, " Lirellis brevibus depressis rufis fissura angusta ; sporidiis fusiformibus multinucleatis (Nos. 361, 507 in part). On leaves of *Fourcroya*. Irregularly scattered, giving the leaves a dingy appearance ; sporidia ·0003 long. The same thing occurs on palm leaves, with the sporidia ·004 long."

In Saccardo, II., p. 769, it was listed as *Gloniella*. Massee re-described it as *Lophodermium*, in Grevillea, XXII., p. 34, and stated " an examination of the type specimen shows the spores to be linear, multiguttulate, and almost as long as the ascus, and are thus represented in two sketches made by Broome and attached to the specimens. The measurements given to these spore drawings are : Specimen on *Fourcroya*, 0·003 in. long, on palm 0·004 in. long. Unfortunately in the diagnosis of this species, in giving the measurements of the spores of the form growing on *Fourcroya*, the decimal point is put in the wrong place, thus ·0003 instead of 0·003."

The individual perithecia are black, oval, immersed, slightly elevated, covered by the epidermis, dehiscing longitudinally, about 0·5 mm. long and 0·3 mm. broad. They are crowded, and often confluent, usually in irregular lines, but sometimes stellately. The perithecial wall is parenchymatous, fused above with the epidermis. The paraphyses are linear, slightly thickened at the apex, and sometimes flexuose above. The asci are cylindric, attenuated below, with a short pedicel, 98–112 × 5–6 μ. The spores are linear, almost as long as the ascus, 1–1·5 μ diameter, contents granular, arranged in a parallel bundle. Massee's measurement of the spores is 60–65 × 1·5 μ.

The Thwaites's numbers cited in the "Fungi of Ceylon" are 361 and 507. The co-type in Herb. Peradeniya is 361 only, on *Fourcroya*. In Herb. Kew the numbers are 361 and 307, the former said to be on *Fourcroya* and the latter on palms. But the figure of 307 in Herb. Kew is labelled *Hyst. Fourcroyæ*, and that of 361 merely *Hysterium*. All the specimens appear to be on *Fourcroya*.

261.—Lophodermium maculare (Fr.) de Not.

Thwaites 434, on leaves of *Symplocos*, was attributed by Berkeley and Broome to *Hysterium maculare* Fr. = *Lophodermium maculare* (Fr.) de Not.

The leaves in the Ceylon specimen bear circular spots, up to one centimetre in diameter, gray, with a purple-brown margin. The perithecia are hypophyllous, scattered, black, oval, with somewhat pointed ends, immersed, very slightly elevated, about 1 mm. long, and 0·4 mm. broad, covered by the epidermis, dehiscing longitudinally. In section the cavity is somewhat rectangular. The wall of the perithecium is parenchymatous, about 40 μ thick at the base, confluent with the epidermis above. The numerous paraphyses are linear, with slightly thickened tips, and the asci are clavate, four-spored, 68–80 × 14–16 μ. The spores are hyaline, continuous, narrow-oval, thick-walled, 26–32 × 6–8 μ.

This species is evidently not *Lophodermium maculare*, but a *Hypodermella*. It may stand as *Hypodermella Symploci*.

Hypodermella Symploci n. sp.—Maculis rotundatis, ad 1 cm. diam., griseis, margine purpureo-brunneo. Peritheciis hypophyllis, sparsis, immersis, parum elevatis, nigris, ovalibus, utrinque acutiusculis, ad 1 mm. long., 0·4 mm, lat.; pariete parenchymato, basi 40 μ crass., supra epidermide confluenti. Paraphysibus numerosis, linearibus, apice subincrassatis. Ascis clavatis, quadri-sporis, 68–80 × 14–16 μ. Sporis hyalinis, continuis, angusto-ovalibus, pariete crasso, 26–32 × 6–8 μ.

262.—Gloniella Drynariæ (B. & Br.) Massee.

Berkeley and Broome described this species as *Hysterium Drynariæ*, "Lirellis immersis flexuosis, labiis candidis;

sporidiis triseptatis ellipticis, apicibus acutiusculis ; conidiis minimis (No. 611). On fronds of *Drynaria quercifolia*. Very lichenoid in appearance, covering the whole of the under-side of the frond. Accompanied by multitudes of pallid minute perithecia filled with oblong spores ·0002 long."

Massee, Grevillea, XXII., p. 16, re-described it under the name of *Gloniella Drynariæ* B. & Br. He stated that there was no evidence of any genetic affinity between the minute perithecia and the *Hysterium*, and described the latter as " Gregarious, covering the entire under-surface of the frond ; perithecia immersed, causing no discolouration, the slightly raised and ruptured cuticle resembling white lips," &c.

The fungus occurs on the scale leaves of the fern. These leaves are persistent, and remain attached to the rhizome, brown and dry, for a long time. In this condition they frequently become covered with lichens on the outer (under) surface, and this has occurred in the case of the specimens in Thwaites 611. The whole of the under-surface is covered with a thin lichen crust, greenish-gray, bearing minute cups ; this crust contains alga cells and numerous crystalloid bodies. The epidermis of the host plant is not visible, and the white lips are merely the edges of the lichen covering. No discolouration is evident in the lichen, but the whole of the leaf is brown throughout.

The fungus, however, does not appear to be part of the lichen. The perithecia are entirely embedded in the tissue of the host plant, and all the cells of the latter are permeated with hyaline mycelium. Their presence is indicated by the cracking of the epidermis, and consequently of the lichen, in straight, curved, or branched lines, 1–2 mm. long. In section the perithecia are broadly concave, up to 0·5 mm. diameter, or deeply concave, about three-quarters of a circle, 0·2–0·4 mm. diameter. The perithecial wall is red-brown, about 0·2 mm. thick. The asci are cylindric, eight-spored, the spores obliquely uniseriate or sometimes transverse, 72–96 × 10–12 μ. The paraphyses are linear, branched, and fusing above. The spores are oval, with rounded ends, three-septate, not, or slightly, constricted at the septa, 10–12 × 5–7 μ. Massee's spore measurement was 14–16 × 6 μ.

263.—Gloniella atramentaria (B. & Br.) Sacc.

This species was described by Berkeley and Broome as *Hysterium atramentarium*, "minutum, ellipticum, e crusta nigra oriundum; sporidiis clavatis trinucleatis (No. 300). On wood. Lirellæ scarcely visible to the naked eye; asci short, linear; sporidia hyaline, ·0003." In Saccardo, II., 767, it was included under *Gloniella*. Massee re-described it in Grevillea, XXII., p. 34.

The perithecia are oblong-oval, about 0·4 mm. long, 0·15 mm. broad, immersed, then erumpent, prominent, pulvinate, rounded or acutely ridged above, dehiscing longitudinally. Berkeley and Broome's "Crusta nigra" appears to be merely the blackened wood. The paraphyses are numerous, linear, longer than the asci. The asci are eight-spored, cylindric, 40–45 × 3–4 μ, with obliquely uniseriate spores. In the part of the type specimen examined by me only immature spores in the ascus were observed; these were narrow oval or fusoid, one-septate, 4–6 × 2 μ. Massee gave the spores as hyaline, three-septate at maturity, 7–8 × 4 μ.

264.—Gloniopsis orbicularis (B. & Br.) Massee.

This species was described by Berkeley and Broome as *Glonium orbiculare*, "Lirellis circinantibus in maculam orbicularem congestis; sporidiis oblongis quadriseptatis (No. 671). On Bamboo. Nearly ¼ inch across; lirellæ circinating round a central naked black spot, superficial, easily chipping off; sporidia ·0005 long, but scarcely mature." In Saccardo, II., 769, it was included under *Gloniella*. Massee (Grevillea, XXII., p. 33) re-described it as *Gloniopsis*.

The stromata are black, superficial, circular, about 6 mm. diameter, flat, thin, readily separable from the host. They bear concentric, or spirally arranged, ridges, in which the perithecia are situated, the centre of the stroma being usually even and barren. The stroma is about 0·3 mm. thick in the centre, brownish-white internally, with a thin, black, carbonaceous outer layer. The context is parenchymatous, the hyphæ being more or less parallel to the substratum in the barren parts, but erect and parallel in the ridges. There is no

true perithecium; the cavities are small, circular in section, and about 70 μ diameter, splitting along the apex. Numerous paraphyses are present.

Berkeley and Broome gave the spore as 12·5 μ long, four-septate, but scarcely mature. The co-type in Herb. Peradeniya is in the same condition, and the spores observed in it are greenish-hyaline, narrow-oval to subfusoid, 12–14 × 3–4 μ, three-septate. Massee found, in the type in Herb. Kew, spores "three-, then five-septate and with a few vertical septa, 12–15 × 6–7 μ."

The tissue of the host plant appears quite sound, and does not contain any mycelium. Some of its cells are filled with starch.

265.—Micropeltis granulata B. & Br.

This was described in Fungi of Ceylon, No. 1139, as "Minuta granulata, ascis linearibus; sporidiis lævibus late ellipticis. On leaves of *Caesalpinia sepiaria*. Matale, March, 1868. Rather spread out at the base, coarsely granulated, growing on the green parts of half-dead leaves; sporidia ·0005 by ·0003."

The leaves bear minute scattered black patches, about 0·25 mm. diameter, which are circular, broadly conical, and coarsely granular with scattered warts. Sections show that the black area is a clypeus formed beneath the cuticle; it is opaque and carbonaceous, except in the centre, where the cellular structure is evident; it is about 34 μ thick at the edges, thinning to about 10 μ or less in the centre; there is no true ostiolum.

The single loculus is formed beneath the clypeus, which in some cases extends beyond it, but in others does not wholly cover it. It is formed beneath the cuticular clypeus, and presses downwards the epidermal cells and the mesophyll. Its wall is hyaline and thin. There is no stroma in the usual sense, and no blackened zone, excepting the clypeus. The loculus is flattened, laterally oval, about 220 μ diameter, and 90 μ high in the middle. The asci are cylindric, or cylindrico-clavate, eight-spored, with obliquely uniseriate spores, 80–96 × 12–14 μ, furnished with linear paraphyses. The spores are oval, hyaline, continuous, minutely verrucose, 13–18 × 7–10 μ.

This species is evidently not Micropeltis. It appears to be a reduced Trabutia, and may stand provisionally as *Trabutia granulata* (B. & Br.).

266.—Micropeltis gomphispora B. & Br.

This was described by Berkeley and Broome, in Fungi of Ceylon, No. 1137, as "Minutissima, hemisphærica, margine vix applanato ; sporidiis biseriatis cuneiformibus ; endochromate utrinque contracto. On leaves of *Pavetta indica*. Extremely minute ; sporidia obtuse at either end, separated into two portions by a hyaline line, ·0003 to ·0006 long ; perithecia minutely granulated, ·001 in diameter, or less." In Saccardo, II., p. 665, it was listed as *Microthyrium*.

The leaf in the type is Pavetta, but it appears to be *Pavetta angustifolia*, rather than *P. indica*. The perithecia are superficial, epiphyllous, scattered, about 0·1 mm. diameter, black, shining, minutely rugose, circular, flattened pulvinate. There is no free mycelium. The upper layer or cover is black-brown, composed of small irregular cells, not radially arranged, with a central circular ostiolum. The asci are ovate, 35–40 × 16 μ, eight-spored, spores biseriate, with short linear paraphyses. The spores are oblongo-fusoid, or ovate, with obtusely rounded ends, blackish-brown, with a pale septum about one-third the length of the spore from the upper, broader end, not constricted at the septum, 8–10 × 4–5 μ. The spore wall is hyaline over the septum ; when viewed in profile, the dark wall of the spore is interrupted by a short hyaline length over the septum.

This species belongs to the *Hemisphæriaceæ*, Section *Dictyopeltineæ*. It differs from all the recorded genera in its dark spores, and would appear to require the institution of a new genus, which may be known as *Phæopeltis*.

Phæopeltis, gen. nov., *Dictyopeltineæ*.—Cover netted, not radial ; ostiolate ; spores black-brown, one-septate ; paraphyses present.

Berkeley and Broome's species will then stand as *Phæopeltis gomphispora* (B. & Br.).

267.—Micropeltis applanata Mont.

This was recorded from Ceylon in Fungi of Ceylon, No. 1138, on leaves of *Agyneia multilocularis*. Berkeley and Broome added the note "Sporidia fusiform, multiseptate, ·0002 long; in *M. marginata* ·0003 long." It is not clear whether they meant that the first of these measurements had been obtained from the Ceylon specimen, or whether they were merely giving general information.

The fructifications, in Fungi of Ceylon, No. 1138, are black, epiphyllous, superficial, scattered, circular, about 0·5 mm. diameter, scutate, minutely granular. The upper layer is netted in structure and blue-green, with a narrow hyaline margin. There is no free mycelium. The ostiolum is central and circular. Beneath the upper layer there is a dense layer of crystalloid bodies. The asci are obclavate, thick-walled, about 48 × 14 μ, without paraphyses. Most of them are not quite mature, but a few show fusoid-cylindric spores, with rounded ends, hyaline, rather thick-walled, two-septate, 16 × 4 μ.

Von Höhnel has re-described *Micropeltis applanata* Mont. from the type specimen (Fragmente, X., No. 479). He gives the diameter as 900 μ, the asci 100–110 × 20 μ, furnished with paraphyses, and the spores 32 × 10 μ, four to five septate.

The Ceylon species evidently belongs to Theissen's Dictyopeltineæ (Myc. Centralb., III., p. 285). It differs from Micropeltis in the absence of paraphyses and in the two-septate spores. Sydow (Ann. Myc., XI., p. 404) has instituted the genus Micropeltella for species of Micropeltis without paraphyses, but this is limited by Theissen (*loc. cit.*) to those with spores three or more septate. It would appear reasonable to extend it to include species with two-septate spores. The species may then be known as *Micropeltella Thwaitesii*.

268.—Dothidea orbis Berk.

This species, though described in the Fungi of Ceylon by Berkeley and Broome, was attributed to Berkeley only. There is only one leaf in the type. It was said to be on *Litsea*,

but Theissen and Sydow, who have re-examined the type specimen, query that determination. The original description is "Parva, orbicularis; sporidiis oblongis angustis uniseptatis. Sporidia ·0006 long." Theissen and Sydow have placed it in *Otthia*, as *Otthia orbis* (Berk.) Theiss. & Syd. (Ann. Myc., XII., p. 179), stating that the spores are brown, 18–22 × 4 μ.

Fresh specimens, identical with the type, have been collected on *Litsea zeylanica*. The fungus grows on the under-side of the leaf, the perithecia being at first scattered, then clustered in groups of about twelve, forming small discoid patches. The individual perithecia are about 0·1 mm. diameter, conoid, black, minutely rugose, ostiolate. They are seated on a thin film of agglutinated hyphæ, by which they are attached to the leaf. The cluster of perithecia and the basal stroma are superficial. The wall of the perithecium is thick, not carbonaceous, and when fresh is reddish internally. The asci are clavate, very shortly pedicellate, thick-walled at first, eight-spored, spores biseriate, 40–60 × 7–8 μ. There are no paraphyses. The spores are fusoid or subcymbiform, ends obtuse, one-septate. Spores in the ascus, from fresh specimens, were greenish hyaline, 10–15 × 2·5–3 μ; extruded spores from the same collection were hyaline, 14–18 × 4–5 μ. In the part of the type examined the spores were hyaline, 14–18 × 4–5 μ, but a single brown spore, 16 × 4 μ, was observed.

The species appears to be *Lizonia*, not *Otthia*, and will stand as *Lizonia orbis* (Berk.).

269.—Asterina micropeltis B. & Br.

Berkeley and Broome described this species, in Fungi of Ceylon, No. 1141, as "Peritheciis punctiformibus solitariis, mycelio brevi ramoso cinctis. On leaves of *Jambosa hemisphærica*." *Jambosa hemisphærica* is *Eugenia hemispherica* Wight.

The fungus occurs on the upper surface of the leaf, forming minute, superficial, scattered, black points, up to 0·5 mm. diameter. These are at first flattened convex, and when

mounted show a netted structure, which merges at the margin into a thin sheet of hyaline hyphæ running over the leaf. The hyphæ are about 4 μ diameter, sometimes constricted at the septa, and do not bear hyphopodia. Older examples are elevated in the centre, and show a developing perithecium about 0·3 mm. diameter, with a parenchymatous wall, surrounded by a dense weft of hyphæ, which merges into the hyaline hyphæ as before. The ostiolum is about 30 μ diameter. Unfortunately all the specimens in the type appear to be immature.

270.—Phoma Lobeliæ B. & Br.

This species was described by Berkeley and Broome in Fungi of Ceylon, No. 802, from Thwaites 301, on *Lobelia nicotianæfolia*. Their description is "Pustulis epidermide alba tectis, demum emersis ; sporis ellipticis. Spores 3·75 μ long." The fungus grew on the dead flowering stalks of the Lobelia.

The pycnidia are lenticular, immersed in the cortex ; they are oval in plan, up to 0·5 mm. long and 0·3 mm. diameter, and 0·15 to 0·2 mm. high. They remain covered by the whitened epidermis, as a rule. The ostiolum is broadly conical, or subcylindric, short, and protrudes through the epidermis. The wall of the pycnidium is stout, black, and parenchymatous. The spores are oblong with rounded ends, 5–9 × 1·5–2 μ, and show a blue band across the middle on staining with Cotton Blue ; with these are flexuose or uncinate spores, tapering towards the ends, 14–24 × 1 μ. In modern classification this is a Phomopsis, and will stand as *Phomopsis Lobeliæ* (B. & Br.).

The co-type in Herb. Peradeniya contains principally an entirely different fungus. This forms stromata between the wood and the cortex, usually superficial on the wood, but sometimes slightly immersed in it, becoming free when the outer tissues weather off. They are small, black, irregularly pulvinate, scattered, either circular, 0·5 mm. diameter, or oval, 0·6 × 0·4 mm., often ridged, with broadly conical, obtuse ostiola, which penetrate the epidermis but scarcely project. Internally they are dark brown and parenchymatous, and contain a few, distant, globose perithecial

cavities, up to 0·25 mm. diameter. The asci are cylindrico-clavate, eight-spored, 66–80 × 10 μ. The spores are fusoid, thin-walled, fuscous, straight, five-septate, slightly constricted at the septa, 26–32 × 4 μ. This is a Melogramma, which may stand as *Melogramma Lobeliæ*.

271.—Cladosporium congestum Berk.

In Hooker's Journal of Botany, Vol. VI. (1854), p. 208, Berkeley described two species of Cladosporium, viz., *Cladosporium scopæforme* from India and *Cladosporium congestum* from Ceylon.

Cladosporium scopæforme occurred on the under-side of the leaves of *Myristica Churra*. It was described as "Cæspitulis parvis orbicularibus; floccis erectis simplicibus nodosis; sporis clavatis elongatis curvis subhyalinis. Erumpent; spots small, orbicular, sometimes scutellæform, consisting of a tuft of erect, simple flocci, which are more or less waved, and repeatedly, though not sharply, geniculate above. Spores clavate, elongated, attenuated below, nearly colourless, 0·001 to 0·002 of an inch long. A very pretty and distinct species, with the habit of a minute Circinotrichum. If the spores were septate it would come very near to Corda's genus Helicoryne." The host plant is probably *Myristica gibbosa* Hk. f. & Th., which was collected near Churra.

Cladosporium congestum occurred on the under-side of leaves of Litsea. It was described as "Cæspitulis parvis orbiculari bus, floccis erectis simplicibus, sporis brevioribus clavatis curvis subhyalinis. Spores not exceeding 0·001 inch. Thread even, not nodulose. Closely allied, but distinct."

In the Fungi of Ceylon (Jour. Linn. Soc., XIV., p. 99) Berkeley and Broome recorded for Ceylon both *C. scopæforme* and *C. congestum*. The former was said to grow on leaves of *Cinnamomum zeylanicum*, and to have spores 0·002–0·0025 inch long. The latter was on leaves of Litsea, and had "floccis tenuibus flexuosis; sporis oblongis curvulis trinucleatis," with the "habit of the former."

Reference to the Ceylon specimens in Herb. Kew shows that there is only one specimen of *C. congestum*; it is marked "on Litzæa, Ceylon," and has no date or collection number.

Under *C. scopæforme* in Herb. Kew are a Ceylon specimen without date or collection number; another, Thwaites 424; and a third, Thwaites 485. Most of these unnumbered Ceylon specimens were sent by Thwaites in 1854, so that it is probable that Berkeley had the undated Ceylon specimen of *C. scopæforme* at the time he published the description of that species.

The Ceylon specimens of *C. scopæforme* and *C. congestum* are identical. I regret that, being under the erroneous impression that the Ceylon specimen was the type, I did not examine the Indian specimen of *C. scopæforme* on Myristica, but if Berkeley's description is correct, that species cannot be the same as *C. congestum*, for the latter is not erumpent, and its conidiophores are not nodulose. It is possible, however, that Berkeley's " nodosis " means geniculate.

In Fungi of Ceylon, No. 1177, Berkeley and Broome enumerated *Meliola zigzag* B. & C., citing Thwaites's numbers 424 and 485. These, it will be noted, are the numbers now included in Herb. Kew under *C. scopæforme*. In the cover of *Meliola zigzag* in Herb. Kew there is part of Thwaites 424 only.

Meliola zigzag, or, as the name was published, *Meliola zigzac*, was described by Berkeley in " Cuban Fungi," No. 882 (Jour. Linn. Soc., X. (1869), p. 392), as " Floccis repentibus confervoideis, articulis utrinque emarginatis obliquis; peritheciis setis acutis tenuibus curvulis cinctis; sporidiis magnis, conidiis helminthosporoideis triseptatis utrinque appendiculatis. Sporidia 0·002 inch long; conidia 0·0016. The flocci are very peculiar."

Meliola zigzag was re-described by Gaillard (Le Genre Meliola, p. 81) from part of the type specimen, Cuba 882. He described the mycelium as possessing hyphopodia and setæ, and gave the dimensions of the perithecia and spores. After the description, Gaillard added the following observation: " Nous avons fait cette description d'apres un spécimen des Fungi Cubenses, n. 882; l'appareil conidifère etait imparfaitement développé, et se rédusait au mycelium. Berkeley indique dans sa description; Conidiis helminthosporoideis, 40 μ long., triseptatis, utrinque appendiculatis. Les ' floccis repentibus confervoideis, articulis utrinque emarginatis

obliquis' ne sont certainement autre chose que les soies conidifères, qui ont cette form dans un certain nombre d'espèces."

On looking up the Ceylon specimen of *Meliola zigzag* in Herb. Kew, it is at once seen that the greater part of the fungus on the leaves is *Cladosporium congestum*. There is, in addition, a fungus which forms very thin, cloudy, black patches. The latter patches consist of repent, interlacing hyphæ, 3–4 μ diameter, sometimes united into strands; the hyphæ are fairly regular, are destitute of hyphopodia, and bear a few scattered, erect, simple, conidiophores, up to 70 μ high. These cloudy patches are much larger than the Cladosporium patches, and can scarcely be an immature state of the latter. The leaves also bear black, compact patches, up to 1 mm. in diameter, consisting of a basal layer of interwoven, thin, black hyphæ; in this layer occur immature perithecia, crowded together and ultimately completely covering it. These appear to be immature *Dothidea orbis* (Berk.). Whether either of these is what Berkeley and Broome attributed to *Meliola zigzag* is uncertain, but there is apparently nothing which approaches Gaillard's description of the Cuban fungus.

The description of *Meliola zigzag* was published in 1869, at a time when Berkeley already had in his possession the bulk of the Thwaites's collection of Ceylon fungi. In view of Gaillard's note, it would seem possible that the description of *Meliola zigzag* includes details from the Ceylon specimens of *Cladosporium congestum*.

Cladosporium congestum forms lax, blackish-brown tufts of hyphæ, up to 1 mm. diameter, or larger by confluence. The whole tuft is superficial, and separates from the leaf like the mycelium of a Meliola. The hyphæ are blackish-brown, sub-erect, regular, about 4 μ diameter, septate, flexuose above, up to 1 mm. long. At the base of the tufts are compact, nodular masses of mycelium, from which some of the erect hyphæ arise. Perithecia were not found. The smaller conidia are blackish-brown, cylindric, often curved, two to three septate, 24–33 × 4–6 μ; the larger are clavate, curved or sigmoid or straight, strongly attenuated, and almost hyaline below, four to six septate, 44–60 × 6–8 μ.

272.—Rhinotrichum globiferum B. & Br.

This species was described from Thwaites 61 as "Aureum : floccis ramosis, parce articulatis ; sporis sparsis globosis."

The fungus, in the co-type in Herb. Peradeniya, forms effused, thin, lax, velvety, rufous-brown patches. The hyphæ are irregularly intertwined, flexuose, yellow-brown, and vary from 7 to 12 μ in diameter. The distance between the septa is usually from 40 to 60 μ, and the segments may be either strongly inflated or even. The conidia are borne laterally on short persistent pedicels along the terminal segments, the last segment being sometimes inflated into an ovoid head, about 16 × 14 μ, or on similar pedicels on short, elongated, ovoid, lateral branches ; they are globose, yellow-brown, smooth, internally granular, 13–16 μ diameter.

This is a Physospora, and will stand as *Physospora globifera* (B. & Br.). The hyphæ and spores are paler, and have thinner walls, than those of the Ceylon species attributed to *Physospora spiralis* Penz. & Sacc., and the terminal segments are shorter and differ in shape. The conidia of the latter species, in Ceylon specimens, are always minutely warted.

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A New Variety of Exacum zeylanicum Roxb.

BY

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IN the course of a botanical excursion to Kunadiyaparawitta at Christmas, 1917, Mr. F. Lewis collected a white Exacum, which differed from *Exacum Walkeri* Arn. in that the flowers were pure white, without the green "eye" which characterizes that species. Further examination of the specimen shows that it closely approaches *Exacum zeylanicum* in most details, and it may, at least provisionally, be regarded as a variety of the latter.

The leaves are up to 6·5 cm. long, narrow-lanceolate, and usually strongly attenuated towards the tip. In some specimens the leaves are crowded, the consecutive pairs of leaves being 1·5–2·5 cm. apart, but in others they are distant, and up to 5 cm. apart. The arrangement of the leaves in the former specimens approaches that of specimens of *E. zeylanicum* collected by Trimen on Pidurutalagala at 7,400 feet.

The flowers are few, and the inflorescence lax. The largest available inflorescence bears only eight flowers, and the branches of the inflorescence usually terminate in single flowers. The petals are white, oval, obtuse or subacute, not differing in shape from those of *Exacum zeylanicum*.

The only structural difference which separates this form from *Exacum zeylanicum* is the shape of the anther. In *E. zeylanicum* the anthers are, normally, long and attenuated upwards, frequently attaining a length of 6 mm.; and they are furnished with terminal pores. In the white form under notice they are comparatively short and stumpy, about 4 mm. long, not noticeably attenuated, and the apex of the anther is curved towards the inner face, so that the pores are subterminal or almost lateral. In their short stumpy form

these anthers resemble those of *Exacum zeylanicum var. pallidum*, but the tips of the anthers in the latter are not curved.

In *Exacum Walkeri* the anthers are short and stumpy, but, in the dried herbarium specimens, they exhibit a feature which at once separates them from *E. zeylanicum*. On drying, the furrow on the outer face assumes a V-shape at the apex, and immediately above this is a minute tubercle formed of clavate cells, up to 80 × 30 μ, with free, rounded ends.

White forms of *Exacum zeylanicum* have not been previously recorded. Trimen, in Flora of Ceylon, III., 182, under *E. macranthum*, wrote: "A remarkable white variety was gathered (by Miss Baker) in 1882, with pure white flowers, having the corolla segments jagged at the margins." The specimen is not now in Herb. Peradeniya.

It is proposed to call the present form *var. Lewisii*, characterized by its white flowers and incurved anthers.

Explanation of Plate.

Fig. 1.—Anther of *Exacum zeylanicum var. Lewisii*, outer face.

Fig. 2.—Anther of *Exacum zeylanicum var. Lewisii*, inner face.

Fig. 3.—Anther of *Exacum zeylanicum var. Lewisii*, latera view.

Fig. 4.—Anther of *Exacum Walkeri*, outer face.

Fig. 5.—Anther of *Exacum Walkeri*, inner face.

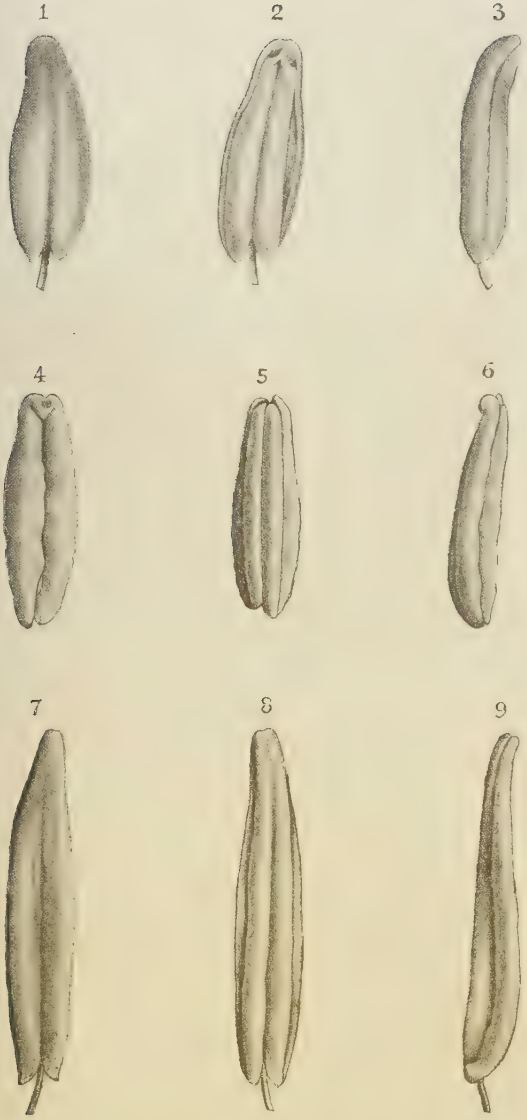
Fig. 6.—Anther of *Exacum Walkeri*, lateral view.

Fig. 7.—Anther of *Exacum zeylanicum*, outer face.

Fig. 8.—Anther of *Exacum zeylanicum*, inner face.

Fig. 9.—Anther of *Exacum zeylanicum*, lateral view.

All figures drawn from herbarium specimens and enlarged seven diameters.



ANTHERS OF EXACUM.

Oxalis in Ceylon.

BY

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IN many of our up-country tea districts the weed *par excellence* on tea estates is Oxalis, or Manickwatte weed, usually, when a scientific name is required, known as *Oxalis violacea*. The name Manickwatte weed is derived from Manickwatte estate, where, in 1890, the tea fields formerly in coffee were said to resemble clover fields if left for any length of time unweeded, owing to the growth of this plant. (Peradeniya MSS.) As in the case of many other common weeds, its origin in Ceylon is by no means clear, and the evidence on the point is largely negative. The following account summarizes what is available.

To begin with, it may be pointed out that, in addition to the native yellow-flowered *Oxalis corniculata*, the *Hin-embul-embiliya* of the Sinhalese, there are two species of Oxalis occurring as introduced weeds in Ceylon. This fact was known to Trimen, but it has been most unaccountably overlooked by later botanists. In Trimen's "Hortus Zeylanicus," published in 1888, he listed the two, one as *Oxalis latifolia* H.B.K., and the other, with a query, as *Oxalis violacea* L. The query mark was probably misplaced by the printer, for on the herbarium specimens named by Trimen it is attached to the one assigned to *O. latifolia*. It has previously been recorded that the latter, which is the common Manickwatte weed, is *Oxalis corymbosa* DC. (Ann. Perad., V., 541), and this identification has now been confirmed by Kew. The other, less common species, which is the *Oxalis violacea* of Trimen's "Hortus Zeylanicus," has been identified by Kew as *Oxalis latifolia* H.B.K. As far as is known, *O. violacea* is not found in Ceylon.

Oxalis violacea was recorded as growing in Ceylon by Moon in his "Catalogue of the Indigenous and Exotic Plants growing in Ceylon," published in 1824. It was one of the plants which had not been recorded by any one previously, and, as with very many of the plants recorded for the first time by Moon,

it was a garden plant. This is evident from the locality cited by Moon, viz., North America, and from a note "from Bourbon," in Moon's handwriting, in his copy of Willdenow in the Peradeniya library. Moon gave a native name for it, *Rata-embul-embiliya* (in modern spelling), but this is an obvious coinage from the native name of the yellow-flowered Oxalis. Unfortunately we cannot get any further from Moon's record, for the reason that there is no herbarium specimen extant. The Director of the Royal Botanic Gardens, Kew, who has kindly had inquiries made, informs me that there is no specimen of Oxalis collected by Moon, either in the Kew herbarium or in that of the British Museum (Natural History). Consequently we do not know whether Moon had *Oxalis violacea*, or *O. corymbosa*, or *O. latifolia*. But as it was introduced from Bourbon, it was probably *O. corymbosa*.

Presumably Moon's plant was then growing in the Botanic Gardens at Peradeniya. Both the species now common are rather up-country weeds, *O. latifolia* more so than *O. corymbosa*. But both occur, and have occurred for the last thirty years, as weeds in the Peradeniya Gardens. There *Oxalis latifolia* is small, spreads very slowly, and is apparently not found outside the Gardens, but *O. corymbosa* is more vigorous, and may be found along the road-sides and on tea estates in the neighbourhood. But the latter is not yet a serious weed at this elevation. The diminution in its colonizing ability as *O. corymbosa* approaches its lower limit is very clearly evident on estates which extend from about 1,500 feet to 3,500 feet elevation. On the upper fields *Oxalis corymbosa* may be rampant, while on the lower fields only a few scattered plants are to be found, though the individual plants seem vigorous enough.

Neither of these species of Oxalis was collected by Gardner or Thwaites (1844–1880). The first specimens placed in the Garden herbarium, which is supposed to contain all the foreign plants, cultivated or weeds, which grow in the Gardens, are dated 1887 and marked "weed." They include both species. It may, I think, be deduced from this, and the evidence which follows, that Moon's species, whether *O. violacea* or not, did not long survive its introduction, and is not the source of the weeds of the present day.

For nearly sixty years after the publication of Moon's book we have only negative evidence. Gardner, in 1848, published a paper, entitled "Some General Remarks on the Flora of Ceylon," in which he enumerated the common introduced weeds, but he did not mention Oxalis. Thwaites did not refer to *Oxalis corymbosa*, or any similarly-coloured species, in his "Enumeratio Plantarum Zeylaniæ," published 1864, though he gave a list of the commoner foreign weeds in the preface. Six years later Thwaites enumerated the common plants at Hakgala in a letter to W. Ferguson, who was then about to visit the Gardens there on a collecting trip; in it he states that the introduced *Erigeron linifolius* is worse than Ageratum at Hakgala (December 9, 1870). Evidently Oxalis was not a weed there then.

The first record of Oxalis as a weed is contained in a letter from W. Ferguson, dated October 31, 1882, to Dr. Trimen, who was just starting on a visit to Lindula. Ferguson wrote: "I saw Mr. Sinclair this morning, and he will be with you at Peradeniya to-morrow morning, and drive you from Nawalapitiya, which will be much nicer in every way than going in the coach. I have asked him to point out the rose-flowered Oxalis which has escaped and spread for some miles along the road-side beyond where the horses are changed in Kotmale. You will see it on your left-hand side going up." Apparently this was new to Ferguson, though he had botanized over the Island for about thirty years. We have no specimen from Kotmale in 1882, and consequently cannot say positively which species this was. But as the Kotmale weed is now *O. corymbosa*, it was most probably that species.

Both *O. latifolia* and *O. corymbosa* were collected as weeds in the Botanic Gardens, Peradeniya, in 1887, but neither has ever given serious trouble there. At Hakgala Oxalis did not become worthy of note until 1892; in the Annual Report for that year it is stated that "the imported weed *Oxalis violacea* has become a real pest." Both species now occur at Hakgala, but *Oxalis latifolia* is, or was up to 1914, certainly the more abundant.

The date of introduction of *Oxalis latifolia* at Hakgala is not known. It was grown there at first under the name of

Oxalis Deppei, and was advertised for sale under that name as a vegetable in 1879 (Morris, Catalogue of ..... Trees, &c., suitable for distribution). In 1908 it was re-introduced under the name of *Oxalis brasiliensis*.

On the evidence available it would appear that *Oxalis latifolia* was introduced by the Botanic Gardens, prior to 1879, and it is not yet a serious weed, except at Hakgala. The common pest of tea estates is *Oxalis corymbosa*, and this began to spread, about 1882, from a centre in Kotmale.

The following are the more obvious points of difference between the two species. In *O. latifolia* the sides of the leaflets are straight, or nearly so, so that the leaflets are triangular, while in *O. corymbosa* the sides of the leaflets are rounded. When young the leaflets of *O. latifolia* are frequently marked with purple streaks, but in large full-grown specimens they are, if anything, paler than those of *O. corymbosa*. In stunted specimens of *O. latifolia* the leaves may be violet underneath. The leaf-stalk of *O. latifolia* is glabrous, that of *O. corymbosa* hairy. The inflorescence of *O. corymbosa* is branched, that of *O. latifolia* simple.

In the flower the coloured area of the petal in *O. latifolia* is sharply differentiated from the lower greenish part, but in *O. corymbosa* there is a gradual transition from the greenish base to the purple-rose colour above, and the petals are strongly veined. In all the Ceylon specimens examined the styles of *O. corymbosa* are intermediate in length between the two sets of stamens, and are bent outwards above at an angle of about 30°; in *O. latifolia* the styles are shorter than, or almost as long as, the lower set of stamens, and are bent outwards almost at right angles.

Oxalis corymbosa produces bulbils at the apex of the "carrot." *Oxalis latifolia*, as a rule, produces short white runners underground, each of which bears a bulbil at its extremity; but when the plant is growing on the surface of the soil, these runners are more or less suppressed or shortened, and the bulbils then have the appearance of being developed in the same way as those of *O. corymbosa*. Seeds have not been found in either species in Ceylon.

In the Journal of Botany, LVI., p. 122, M. J. Godfrey, reviewing Sommier and Galto's Flora Melitensis Nova, makes the following comment: "Another interesting plant is *Oxalis cernua*, a trimorphic species from the Cape of Good Hope, of which only the short-styled form grows in Malta. It was first mentioned by Giacinto in 1806 in a list of plants in the Malta Botanical Gardens. To such an extent has it spread that the fields are yellow with it, as fields at home sometimes are with charlock, and it is found everywhere, on the walls, by the road-sides, and in such abundance that it far exceeds all the other flowers together. The extraordinary thing is that all this immense profusion of flowers results in no production of capsules, the other forms capable of fertilizing the ovary being absent. The authors of the Flora, one of whom has lived in Malta all his life, state that they have never seen it in fruit. It appears, however, that recently it has been found at Naples and Palermo with mature seeds, and it has been suggested that possibly, after its long isolation, it has acquired the faculty of being fertilized by pollen of the same form. This has not occurred at Malta, where it has been much longer established, and it would seem more probable that one of the other forms may have been cultivated in gardens at Naples and Palermo, or that it may have been fertilized from some other garden species. A form with double flowers is very abundant in Malta and Lampedusa, which furnishes confirmation of Darwin's theory that sterility is the exciting cause of double flowers. It is curious that such an immense amount of energy should be wasted in the production of useless flowers. One would have thought they would tend to disappear when the method of propagation became purely vegetative, *i.e.*, by the bulbils on the roots."

Though double flowers have not been observed on either *Oxalis latifolia* or *O. corymbosa* in Ceylon, they present in other respects an exact parallel to *O. cernua* in Malta. Neither has ever been found to bear capsules, but both flower freely, and *O. corymbosa* has spread all over the up-country districts, while *O. latifolia* promises to be equally abundant at the highest elevations.

Alocasia indica Schott.

BY

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Alocasia indica was recorded as a cultivated plant in Ceylon in Flora of Ceylon, IV., p. 360, in a note which states : "*A. indica* Schott, *Rata-ala*, *Desi-ala*, S., is much cultivated ; it is closely allied to *A. cucullata*, but has deeply sagittately cordate leaves, 2–3 feet long, narrower spathe, longer spadix, with the appendage longer than the inflorescence." It was not recorded for Ceylon in Flora British India.

The fourth volume of the Flora of Ceylon was completed after Trimen's death by Sir J. D. Hooker. There is consequently some doubt as to the authorship of the note quoted. Some of the notes in Vol. IV. are followed by Trimen's name, others by the initials J. D. H. ; but that one is unsigned.

Trimen included *Alocasia indica* Schott, *Rata-ala*, in his "Hortus Zeylanicus," published 1888. Thwaites, in his "Enumeratio Plantarum Zeylaniæ," stated that *Colocasia indica* was cultivated in native gardens as a vegetable. As Thwaites throughout uses Colocasia instead of Alocasia, he doubtless meant *Alocasia indica* Schott.

In seeking confirmation of the statement that *Alocasia indica* is cultivated in Ceylon, it is found that there is no herbarium specimen from Ceylon either at Kew, the British Museum, or Peradeniya. The only recorded specimen is one collected by Thunberg in Ceylon in 1777–8, and now in his herbarium in Herb. Upsala. According to the evidence, that specimen was determined by Schott.

Schott's original description of *Alocasia indica*, in Oest. Bot. Wochenbl., 1854, p. 410, does not cite the Upsala or any other specimens. Engler, in De Candolle, Mon. Phan., II., 1879, gives Ceylon as a locality for *Alocasia indica*, and cites "Thunberg in Herb. Upsal."

A list of the plants in Thunberg's herbarium, with details of the data on the herbarium sheets, has been published by Professor H. O. Juel, under the name "Plantæ Thunbergianæ."

From that book it appears that Thunberg collected three species of "Arum" in Ceylon, viz., *Arum peregrinum* L., *Arum macrorhizon* Thunb., and *Arum ceilanicum*.

Arum peregrinum L. is *Alocasia macrorrhiza* (L.) Schott. The sheet in Herb. Thunberg bears two specimens, but only the locality Ceylon, though Thunberg enumerated this species in Florula Javanica. According to Schott (in Herb. Thunberg), the specimen is an undetermined Homalomena. If so, it is not a Ceylon specimen, no species of Homalomena being known in Ceylon.

Arum macrorhizon Thunb., according to the herbarium specimens, is a mixture, the Java plant of Florula Javanica, 1825, being different from that of Florula Ceilanica, 1825. The latter is marked Ceilan by Thunberg, but according to Schott's note on the sheet it is *Leucocasia gigantea* Schott [=*Colocasia gigantea* Hook.=*Colocasia indica* of Engl., Araceae, 494 (non Kunth), according to the synonyms in Flora British India]. Here, again, assuming the identification to be correct, this cannot be a Ceylon specimen.

With regard to the third species, which is the one particularly in question, this was named *Arum ceilanicum* by Thunberg on the herbarium sheet, but the name was not published. According to Juel, the data on the sheet are "*Arum ceilanicum* Ceil." "*Colocasia indica* Schott"; that is, Thunberg wrote "*Arum ceilanicum*" on the front of the sheet, and the locality "Ceilan" on the back, while Schott subsequently added the identification "*Colocasia indica* Schott."

Through the friendly offices of the Director of the Royal Botanic Gardens, Kew, Professor Juel has kindly furnished a photograph of this herbarium sheet. It bears the name *Arum ceilanicum*, as written by Thunberg, in the lower right-hand corner, and, in the middle of the sheet at the bottom, a ticket inscribed "*Colocasia indica* Schott. Scrips. et determin. Schott." The two parts of this inscription appear to be in different handwritings. At the right-hand corner of the sheet is a small slip of paper, stuck on perpendicular to the base, with the inscription, "Habaralle (mal)."

Juel states that Thunberg first mounted his plants on sheets 210 × 330 mm., and subsequently removed them to

sheets 240 × 370 mm. "In many cases he tore off the lower edge of the old sheet, on which remarks (as, for example, on native medicinal uses) were inscribed, and affixed it to the new sheet." The slip referred to above would appear to be one of these, for *Habarala* is the Sinhalese name, not Malay, of *Alocasia macrorrhiza* Schott. It may be noted that Thunberg frequently cites Malay names as Sinhalese, and *vice versâ*.

The herbarium sheet bears two inflorescences, one minus the spathe, and a leaf. The leaf is unfortunately folded over, and the attachment of the petiole is not evident on the photograph. Of the two inflorescences, the appendage of one is very much shorter than the male portion of the spadix, while that of the other is slightly longer than the male part of the spadix, but less than the total length of the male and female parts combined. The whole spadix is nearly as long as the spathe.

The relative lengths of the parts of the spadix do not agree with the figure of *Arum indicum* in Wight, Icones, 794, nor with the usual description that the appendage is longer than the inflorescence; on the other hand, they correspond well with specimens of *Alocasia macrorrhiza* in the Peradeniya herbarium. As far as can be determined from the photograph, the specimens are *Alocasia macrorrhiza*, and the Sinhalese name *Habarala* is correctly applied.

It may be noted that *Alocasia macrorrhiza* is one of the common cultivated species in Ceylon, and that it is not otherwise represented in Thunberg's collection.

The Sinhalese name, *Rata-ala*, merely means "foreign yam." At the present day *Rata-ala* and *Desi-ala* are applied, as far as can be ascertained, to a species of Xanthosoma; and Mr. H. L. van Buuren, who is engaged upon an investigation of the Ceylon species of Alocasia, &c., has not been able to find *Alocasia indica*. We have, therefore, no evidence that this species is grown in Ceylon.

Gasteromycetæ zeylanicæ.

BY

T. PETCH, B.A., B.Sc.

THE following list comprises the Gasteromycetæ known to occur in Ceylon, and includes species recently collected, in addition to those recorded by Berkeley and Broome. Papers on the Phalloids have previously been published in the Annals of the Royal Botanic Gardens, Peradeniya, Vol. IV., pp. 139–184, and V., pp. 1–21; and a further description of *Lysurus Gardneri*, under the new name of *Pharus Gardneri*, will shortly appear in the Transactions of the British Mycological Society.

I am indebted to Mr. C. G. Lloyd for the determination of very many of the species, and for liberal assistance in private correspondence, as well as in his valuable publications.

PHALLACEÆ.

Mutinus.

Mutinus bambusinus (Zoll.) Fischer. Peradeniya, May, 1912; a single specimen; abundant, October 29–November 23, 1914.

Mutinus Fleischeri Penz. Hakgala, August, 1908.

Jansia.

Jansia proxima (B. & Br.). A figure of this species was sent to Berkeley and Broome, and was marked by them *Phallus proximus*, but they did not publish it. Massee published a description, under the name *Mutinus proximus*, in Grevillea, XIX., p. 94.

Peradeniya, January, 1869 (Thwaites); November–December, 1906.

Ithyphallus.

Ithyphallus tenuis Fischer. According to Fischer (Neue Untersuchungen, 1893) there are specimens of this species from Ceylon in Herb. Kew and Herb. British Museum, marked *Phallus pallidus* Berk. It is common in the jungle at Hakgala on decaying logs in hundreds at a time.

Dictyophora.

Dictyophora phalloidea Desv. Recorded for Ceylon as *Phallus dæmonum* Rumph. by Berkeley in Hooker's Lond. Jour. of Botany, VI. (1847), and as *Dictyophora dæmonum* Lév. by Berkeley and Broome in Fungi of Ceylon, No. 698.

Common in the low-country (wet zone) up to an elevation of 1,600 feet. A small form with a bright orange-yellow cap occurs at Peradeniya.

Clautriavia.

Clautriavia irpicina Pat. Common, with the same distribution as *Dictyophora phalloidea*. Abundant at Henaratgoda.

Clathrus.

Clathrus crispatus Thw. Recorded for Ceylon by Berkeley as *Clathrus cancellatus* L. in Hooker's Lond. Jour. of Botany, VI. (1847), and by Berkeley and Broome in Fungi of Ceylon, No. 700.

In shady forests, 1844 (Gardner). Hantane, August, 1859 (Thwaites). Hakgala, April, 1907; May, 1913; January, 1914. Ythanside, April, 1909; July, 1913. Not found below 4,000 feet.

Clathrella.

Clathrella delicata (B. & Br.) Fischer. Described as *Clathrus delicatus* by Berkeley and Broome in Fungi of Ceylon, No. 699.

Peradeniya, November, 1868 (Thwaites); August, October, 1906.

Simblum.

Simblum periphragmoides Klotzsch. Recorded for Ceylon as *Simblum gracile* Berk. by Berkeley in Hooker's Lond. Jour. of Botany, V., p. 534, and VI. (1847), p. 512; and by Berkeley and Broome, under the same name, in Fungi of Ceylon, No. 702.

Peradeniya, August, 1844 (Gardner); 1854 (Thwaites). Fairly frequent at Peradeniya.

Pharus.

Pharus gen. nov. Receptaculum stalked; stalk dividing above into arms, which normally unite at the apex; glebiferous layer borne solely on the arms, and consisting of numerous plicate processes and plates, perpendicular to the arm, closely packed together, and presenting a granular outer surface, similar to that of Clautriavia.

Pharus Gardneri (Berk.). *Lysurus Gardneri* Berk., Hooker's Lond. Jour. Bot., V., p. 535, and VI. (1847), p. 512. *Lysurus* (*Desmaturus*) *Gardneri* Schlect., Linnæa, 31 (1861–62), p. 180. *Colus Gardneri* (Berk.) Ed. Fischer, Vers. e Syst. Uebers., p. 77 (1886), and Sacc., Sylloge, VII., p. 21. *Lysurus Gardneri* Berk., in Lloyd, Synopsis of the known Phalloids. Not *Lysurus Gardneri* Berk., in Cleland and Cheel, Notes on Australian Fungi, No. 2, Jour. Proc. Roy. Soc. N. S. W., XLIX., p. 204; LI., p. 364.

Peradeniya, 1835 (Watson); (Gardner); July, 1868 (Thwaites); June, 1906; July, 1907; May, 1909; July, 1909; November, 1914; May, 1918.

Aseroe.

Aseroe rubra La Bill. Recorded as *Aseroe zeylanica* Berk. by Berkeley in Hooker's Lond. Jour. of Botany, V., p. 535, and VI. (1847), p. 512; and under the same name by Berkeley and Broome in Fungi of Ceylon, No. 701. "On the ground, 4,000–5,000 feet, Gardner, Thwaites."

Dunsinane, Pundaluoya, August, 1907. Hakgala, September, 1908; August, 1909, &c. Bandarawela, December, 1907. Ythanside, June, 1911. Fairly common above 4,000 feet, both in the jungle and on estates among tea.

Aseroe arachnoidea Fischer. Peradeniya, June, 1905.

Protubera.

Protubera maracuja Moller. Hakgala (5,600 feet), September, 1908; May, 1910. Nuwara Eliya (6,200 feet), September, 1908, abundant. Not yet found at lower elevations.

NIDULARIACEÆ.

Nidularia.

Nidularia reticulata n. sp. In Fungi of Ceylon, No. 729, Berkeley and Broome recorded for Ceylon, *Nidularia Durieæana* Tul., from Thwaites 1022, which, according to the herbarium specimen, was collected at Peradeniya. Part of the Peradeniya herbarium specimen was submitted in 1906 to Lloyd, who states that it is certainly not *Nidularia Durieæana*, but an unnamed species, differing from all others in the spiny branching fibrils of the peridiole walls (Letter 19). It is described here as *Nidularia reticulata*.

The peridia are now pale brown, pulvinate, up to 4 mm. diameter, with a membranous wall. The peridiola are discoid, circular, flat, pale brown, up to 0·75 mm. diameter. By transmitted light they show a central circular brown opaque area, 0·4 mm. diameter, surrounded by a broad semi-transparent outer zone. The actual peridiole is only about 0·4 mm. diameter, while its outer coat is 0·75 mm. diameter. The peridiole is easily shelled out from its outer coat. This outer coat consists of a thin weft of spinous yellow hyphæ, those of the ground layer being slender, while over or among them are stout, thick-walled spinous hyphæ, up to 12 μ diameter, which form a network, particularly towards the rim, where they unite into a strong, rigid, marginal ring.

Berkeley and Broome gave the dimensions of the spores as 7·5 × 5 μ. The Peradeniya herbarium specimens appear to be immature.

The peridioles of this species, as noted by Lloyd, have some resemblance to those of *Nidula emodensis*. They differ in having a membranous peripheral zone (which, however, may not occur in mature examples), and in the more regular netted arrangement of the coarse hyphæ.

Nidula.

Nidula emodensis (Berk.) Lloyd. Recorded for Ceylon by Berkeley and Broome in Fungi of Ceylon, No. 728, as *Cyathus emodensis* Berk., from Thwaites 1223, collected on Horton Plains. It was collected again (No. 2147) in October, 1906, at Pattipola. The two localities are within four miles of one another.

The peridia are urceolate, white, 6 mm. high, 5 mm. diameter below, expanding near the mouth to 6 mm. diameter, externally strigose, with long rigid hairs, which are sometimes fasciculate. The peridiola are 1·5–2 mm. diameter, circular, flattened, dark brown. The outer coat is easily peeled off; it consists of stout red-brown hyphæ, up to 14 μ diameter, thick-walled or almost solid, branching dichotomously, with short, spiny, lateral branches overrunning an interwoven felted layer of thinner yellow-brown hyphæ of the same character, bound together by a gelatinous substance. When the outer coat is removed the peridiole is rather pale reddish-brown. The inner peridiole wall is dark red-brown, shading to hyaline internally. The spores are thick-walled, greenish-hyaline, oval, or generally slightly pyriform, 6–8 × 4–5 μ, with a few globose 5 μ diameter.

Cyathus.

Cyathus Poeppigii Tul. No. 2143, Gangaruwa, July, 1906, spores up to 40 × 25 μ; det. Lloyd. No. 2657, Kotagala, September, 1908. No. 2134, Peradeniya, December, 1906, spores 20–30 × 16–24 μ. No. 2375, Gatembe, April, 1907, spores 24–32 × 16–20 μ.

No. 2143 was referred to *C. Montagnei* by Massee.

This species, judging from the available collections, is not as common in Ceylon as the next.

Cyathus limbatus Tul. Thwaites's specimen, No. 185, recorded by Berkeley and Broome as *C. Montagnei*, is this species; its spores are 16–22 × 8–10 μ.

No. 2145, Peradeniya, June, 1905, spores 18–24 × 12–16 μ: referred to *C. Montagnei* by Massee. No. 2476, Dunsinane, August, 1907, spores 18–22 × 8–9 μ. No. 3380,

Peradeniya, January, 1912, spores 14–16 × 8–12 μ. No. 3965, Hakgala, April, 1914, spores 16–22 × 8 μ, occasionally 20 × 16 μ. No. 4342, Haputale, spores 17–24 × 9–10 μ, some globose 10 μ. No. 5129, Henaratgoda, August, 1916, spores 15 × 8 μ. No. 5494, Deviturai, August, 1917, spores 14–18 × 8–10 μ, some globose 10–12 μ diameter. No. 2666, Peradeniya, October, 1908, spores 13–20 × 8 μ. No. 2883, Peradeniya, July, 1909, spores in one peridiole 15–19 × 8–12 μ, in another up to 21 × 14–15 μ. No. 3038, Peradeniya, 1909, spores 15–24 × 8–12 μ. No. 3853, Peradeniya, December, 1913, spores 12–17 × 6–8 μ.

The spores are oval, usually with almost parallel sides.

Cyathus striatus Hudson. No. 2324, on elephant dung, Hakgala, March, 1907; det. Lloyd. No. 5557, on elephant dung, Hakgala, December, 1917.

Lloyd, Letter 17, writes of this form: "Differs from the European plant in having larger, narrower, more scabrous cups, and much smaller spores —7 × 12. The spores of the type form are 8–10 × 18–20, hence for those who base new species largely on spore measurements it is a marked species. I can see nothing in it, however, but a form of striatus."

The two collections are identical, and it has not been found elsewhere or on a different substratum. The cups are up to 18 mm. high, usually conico-cylindric, about 2 mm. diameter at the base and 7 mm. diameter at the mouth. The spores vary from 12 × 7 to 5 × 4 μ.

Cyathus stercoreus Schw. No. 2136, on deer dung, Pattipola, October, 1906; det. Lloyd.

Cyathus triplex Lloyd. No. 2144, Peradeniya, October, 1906; det. Lloyd. No. 2135, Middlemarch, October, 1906, spores 16–20 × 9–10 μ; det. Lloyd. No. 2146, Peradeniya, June, 1906, spores 20–25 × 10 μ. No. 3854, Peradeniya, November, 1913, spores usually 15–16 × 10–12 μ, but one 24 × 10 μ. No. 4363, Peradeniya, December, 1914. No. 5556, Warriapolla, January, 1918, spores 16–24 × 10–12 μ.

At first shaggy or strigose with pale brown fascicles of hairs, becoming glabrous or nearly so, especially towards the top. In 2146 the old specimens are adpressed silky, the young specimens strigose ; Massee referred this gathering to *C. vernicosus*. It is frequently found on decaying Mango stones.

Sphærobolus.

Sphærobolus stellatus Tode. Hakgala, fairly frequent. Pattipola.

Sphærobolus rubidus B. & Br. On elephant's dung, Nuwara Eliya, Thwaites 312 ; Hakgala, April, 1907. Re-described. Ann. Perad., IV., p. 63.

LYCOPERDACEÆ.

Podaxon.

Podaxon pistillaris Fr. In "Monograph of the Genus Podaxis" (Jour. of Botany, 1890, p. 76) Massee recorded for Ceylon *Podaxis axata*, citing a specimen said to have been sent by Gardner. It was not enumerated by Berkeley in the published list of Gardner's fungi, nor by Berkeley and Broome in the Fungi of Ceylon.

There is a specimen of *P. pistillaris* in the Peradeniya herbarium, from Mannar, collected by Trimen in February, 1890, and it has been recently collected at Trincomalee (No. 3230, September, 1910). It is reported to be common in the dry sandy districts after or during the rains of the north-east monsoon.

Tylostoma.

Tylostoma Mussooriense P. Henn. Thwaites 1008 was a Tylostoma, which Berkeley and Broome listed in Fungi of Ceylon, No. 711, as *Tulostoma exasperatum*. The specimens in Herb. Peradeniya have strongly verrucose spores, 4–5 μ diameter, and a circular, barely projecting mouth. They appear to be *T. Mussooriense*, not *T. exasperatum*.

This species has not been collected again in Ceylon.

Mitremyces.

Mitremyces insignis (Berk.). This species was described by Berkeley in Decades of Fungi, No. 185, as *Husseia insignis*. In the Fungi of Ceylon, No. 705, Berkeley and Broome enumerated three gatherings, viz., the type collection from Adam's Peak (Gardner); a second by Thwaites, Central Province, December, 1868; and a third by Thwaites, South of the Island, July, 1868. In the Introduction to the Fungi of Ceylon, Berkeley and Broome quote Thwaites to the effect that he had always found Husseia on the sandy margins of forest streams. Husseia is now considered to be identical with Mitremyces. Massee adopted the name Calostoma for Mitremyces.

There are two specimens in Herb. Peradeniya, marked "S. of the Island," collected by Thwaites. It has not been collected recently.

Mitremyces Berkeleyi (Mass.). In Fungi of Ceylon, No. 704, Berkeley and Broome enumerated a Mitremyces, collected by Thwaites, as *M. lutescens*. The gathering consisted of two specimens only, one of which is in Herb. Kew and the other in Herb. Peradeniya. Massee (Ann. Bot., II., p. 39) re-described the Kew specimen as *Calostoma Berkeleyi*, and stated that the spores were smaller than those of *M. Junghuhni* and less coarsely warted, and that the structure and colour of the exoperidium were different. Lloyd (Myco. Notes, No. 20, p. 241) writes that the specimen is *M. Junghuhni* as far as external characters go, but that he did not succeed in finding spores.

Massee gave the spores of *M. Junghuhni* as globose, coarsely tuberculose, pale ochre, 14–18 μ diameter, and those of his *Calostoma Berkeleyi* as globose, minutely verruculose, very pale ochre, 7–9 μ diameter. In the Peradeniya specimen the spores are hyaline, globose, 7–10 μ diameter, reticulated with narrow deep bands, which form a wide-meshed net, and appear at the profile of the spore as a hyaline border interrupted by yellow lines. The spores resemble those of *Trichia affinis*, but with narrower bands.

Geaster.

Geaster plicatus Berk. No. 4471, Peradeniya, December, 1914. No. 4593, Hakgala, May, 1913. This species was collected by Thwaites, No. 1007, and was recorded by Berkeley and Broome in Fungi of Ceylon, No. 706, as *G. Bryantii*. The figure which accompanied the gathering was labelled by Berkeley *Geaster Bryantii*, with the alternative name *Geaster Thwaitesii* B. & Br. A description under the latter name, by Massee, appeared in Saccardo, VII., p. 471. The figure is peculiar in showing a stout pedicel, 7 mm. diameter.

Geaster Bryantii Berk. A single specimen, No. 5573, collected at Horagama, in 1908, appears to be referable to this species. It has the general appearance of *G. plicatus*, but the exoperidium is more divided and more deflexed. The pedicel is stout, and the base of the endoperidium concave, so that the pedicel is socketed in the base. It lacks the radial grooves of *G. plicatus*. The wall of the endoperidium, at the margin of the concave disc, is vertical, scarcely grooved.

Geaster Archeri Berk. No. 2517, Peradeniya, October, 1907; det. Lloyd. No. 2621, Peradeniya, July, 1908. No. 3323, Peradeniya, December 1911. Lloyd (Letter 19) states: "These specimens present a new character in *Geaster Archeri*. The endoperidium is scurfy, 'asperate'; indeed, if it had a pedicel it would be *Geaster asper*."

Geaster triplex Jungh. No. 2618, Peradeniya, August, 1908. No. 2654, Hakgala (jungle), September, 1908. No. 2655, Kotagala, September, 1908. No. 2957, Peradeniya, June, 1909. No. 3908, Hakgala, January, 1914. No. 3992, Peradeniya, December, 1913. No. 5572, Hakgala, December, 1917.

The following note on a Ceylon gathering made in 1906 was published by Lloyd in Mycological Notes, No. 26, p. 339:—

"Among some Geasters recently received from the Botanical Garden, Peradeniya, Ceylon, were some small specimens of *Geaster triplex* with a scaly exoperidium

(Fig. 166). We have seen many specimens of *Geaster triplex*, for it is a frequent plant in many countries, but we never previously saw specimens with a scaly exoperidium. If this form is constant in Ceylon it is entitled to a name (*Geaster squamosus*) as a form, and it is fully as distinct as *Geaster vittatus* based on longitudinal fissures in the exoperidium of the same species. While the character of a scaly exoperidium is absolutely new in the Geaster family, to call it a 'new species' would appear to me to be untrue. Any one who is familiar with *Geaster triplex* would consider it as a mere form."

The above form has not been noted since. The gathering consisted of two specimens only, as figured in Lloyd's photograph.

Geaster mirabilis Mont. No. 2142, Peradeniya, July, 1906; det. Lloyd. No. 2130, Peradeniya, November, 1906. No. 2619, Peradeniya, August, 1908.

This species was correctly recorded for Ceylon by Berkeley and Broome in Fungi of Ceylon, No. 709, from Thwaites 184. There is also an undated collection from Ceylon in Herb. Kew in the cover of *G. papyraceus*.

Common; growing in large patches over heaps of leaves, twigs, &c.

Geaster minimus Schw. No. 4594, Hakgala, October, 1914. These specimens grew from a thick felt of mycelium on the top of a rock.

G. minimus Schw. was recorded for Ceylon by Berkeley and Broome in Fungi of Ceylon, No. 708. The specimens in Herb. Kew and Herb. Peradeniya are Thwaites 1009, and are small specimens of *G. velutinus*.

Geaster coronatus Schaeff. No. 2323, Hakgala, April, 1907; det. Lloyd. Lloyd, in referring this gathering, states: "A most curious form, that could well be made a new species, and certainly entitled to a name as a form of coronatus. The inner peridium has at its base a ring somewhat like the ring on *Geaster Bryantii*, which never occurs on the European plant."

Geaster velutinus Morgan. No. 2931, Peradeniya, September, 1909. No. 3388, Peradeniya, January, 1912. No. 3972, Hakgala, April, 1914. No. 5572, Hakgala, December, 1917; in this gathering some specimens do not exceed 1·5 cm. in diameter when expanded, and unexpanded specimens are distinctly flask-shaped.

Bovista velutina B. & Br., described in Fungi of Ceylon, No. 715, from Thwaites 195, is unexpanded *Geaster velutinus* in Herb. Peradeniya: and the specimens recorded by Berkeley and Broome as *G. minimus* Sch., from Thwaites 1009, are the same species. Lloyd (Myco. Notes, 17, p. 182) refers to the type of *Bovista velutina* at Kew as an unopened Geaster.

Geaster saccatus Fries. No. 2141, Peradeniya, July, 1906; det. Lloyd. No. 2620, Peradeniya, July, 1908. No. 2622, Peradeniya, August, 1908. Warriapolla, January, 1918.

This species was correctly recorded by Berkeley and Broome in Fungi of Ceylon, No. 707, from Thwaites 184. The specimens are, in part, *G. saccatus* in Herb. Peradeniya, but the collection included *G. mirabilis*, and, apparently, *G. velutinus* also.

Lanopila.

Lanopila bicolor (Lév.). This was recorded by Berkeley and Broome as *Bovista bicolor* in Fungi of Ceylon, No. 713, from Thwaites 727. There are specimens of this gathering in Herb. Kew and Herb. Peradeniya, and Lloyd (Myco. Notes, 18, p. 190) states that specimens from Ceylon are to be found in European museums. It has not been collected recently, and is apparently rare at Peradeniya.

Lasiosphæra.

Lasiosphæra Fenzlii Reichardt. The specimen recorded as *Bovista lilacina* by Berkeley and Broome in Fungi of Ceylon, No. 712, from Thwaites 1010, is *Lasiosphæra Fenzlii* in Herb. Peradeniya. The Peradeniya specimen is a section of a subturbinate example, 8 cm. high, with a sterile base 3·5 cm. high. It is not fully mature, and the spore mass is paler than in the ripe form, but it has the usual capillitium and spores, the former nearly hyaline and the latter yellow-brown.

This species is apparently not common at Peradeniya. It was collected about 1903 by Mr. H. F. Macmillan and sent to Lloyd (Puff Ball Letter 1, p. 1). It was again collected at Peradeniya in October, 1907 (No. 2518), and at Hambantota (dry zone) in April, 1908 (No. 2542). No. 2518 is subglobose, has a slight sterile base, and violet-purple gleba ; No. 2542 is turbinate, with a well-developed sterile base, and being immature, the gleba is pale purplish-brown.

The fungus is at first white and even. As it approaches maturity it shrinks slightly, and the peridium contracts in a series of close-set depressions, each about 1 cm. in diameter. The white outer layer disappears from the ridges and exposes the chocolate-coloured inner layer, so that the peridium becomes tessellated. This feature is clearly marked in both the recent specimens, but a larger series may show that it is not universal.

Calvatia.

Calvatia Gardneri (Berk.). Collected by Gardner (No. 9, May, 1844) and first assigned by Berkeley to *Lycoperdon saccatum* (Decades of Fungi, inter 184 et 186). Collected by Thwaites, 739 cum icone, and described as *Lycoperdon Gardneri* in Fungi of Ceylon, No. 716. Lloyd, Puff Ball Letter 2, p. 2, acknowledges specimens from Peradeniya as *Calvatia Gardneri*.

Common at Peradeniya and attains a large size. The largest specimen measured was 17 cm. high, 22 cm. across the longer diameter, and 14 cm. along the shorter. I have been given the Tamil name *Vannan Pothei Kalan*, "Dhoby fungus," for this species, and my informant suggested that it owed its name to a supposed resemblance to dirty soap suds.

Calvatia Gautieroides B. & Br. Described by Berkeley and Broome in Fungi of Ceylon, No. 718, as Lycoperdon, from Thwaites 1006 cum icone ; the specimens were said to grow on burnt earth, and were collected in the Central Province.

Two recent collections have been made, No. 3241, Peradeniya, October, 1910, and No. 5804, October, 1918. The specimens grew from white, cord-like mycelium overrunning

dead twigs. They are ovoid or turbinate, often laterally compressed, up to 5 cm. broad, 3 cm. high, with a short, obconic stalk; usually irregularly lobed, sometimes umbilicate round the stalk, white or pale yellow, becoming ochraceous, minutely scurfy or granular; wall thin, sterile base well developed. Capillitium threads yellow-brown, somewhat rigid, 3 μ diameter, fairly regular. Spores oval, 3–5 × 2·5–4 μ, or globose, 3 μ diameter, pale yellow-brown, echinulate, pale olive in mass. When mature, the wall is fragile and breaks away in small fragments.

Bovista.

Of the three species of Bovista recorded by Berkeley and Broome in the Fungi of Ceylon, one, *Bovista bicolor* Lév., is now known as *Lanopila bicolor;* and another, *Bovista lilacina,* is *Lasiosphæra Fenzlii;* the third, *Bovista cervina,* is apparently an undescribed species.

Bovista cervina Berk. was described from specimens brought by Darwin from South America. A few years later Berkeley enumerated the same species from Ceylon among a collection sent by Gardner (Gardner No. 17). Massee (Revision of the Genus Bovista, Journal of Botany, 1888, p. 184) stated that *Bovista cervina* occurred in Patagonia, Chili, Ceylon, and New Zealand, and was identical with *Bovista aspera* Lév., "as proved by examination of the type specimen in Herb. Mus. Paris." He described the capillitium as flaccid, unbranched, pale, and the spores globose, smooth, very pale brown, minutely pedicellate, 5–6 μ diameter, but his figures of the spores show pedicels one and a half times the length of the spore.

In Mycological Notes, No. 25, p. 324, Lloyd writes concerning *Catastoma subterraneum:* "It was brought from Patagonia by Darwin, and called by Berkeley *Bovista cervina.*" This fixes Berkeley's type specimen, but the Ceylon species is not a Catastoma.

The specimens of Gardner No. 17 in Herb. Kew are globose, not more than 3 cm. diameter, with white cord-like mycelium. The cortex persists in the form of minute, scattered, flat, adpressed, fibrillose patches. The capillitium is pale

brownish-yellow, septate, branched, varying from 3 to 10 μ in diameter. The spores are pale brownish-yellow, or yellow, globose, minutely warted, 3·5 to 4 μ diameter, and not pedicellate.

In 1907 a gathering was made at Peradeniya of a species which was supposed to be *Bovistella citrina*. Lloyd, in acknowledging specimens of this gathering in letter No. 19, wrote: "*Lycoperdon cervinum*, in the sense of Berkeley's Ceylon determination, not of his South American, which is not a Lycoperdon." The gathering (No. 2515) had unfortunately proved to be a mixture, and the only specimens of *Bovista cervina* had been sent, the remainder of the gathering in Herb. Peradeniya being all *Bovistella citrina*. The incident may serve to illustrate the similarity in general appearance between the two species.

In a recent collection, No. 5803 in Herb. Peradeniya, which is immature, the specimens are globose, or depressed globose, up to 4 cm. diameter, fawn-coloured, or brownish-fawn, above, passing into brownish-yellow at the sides. The cortex is about 0·5 mm. thick, fleshy and yellow internally, and covered with a layer of interwoven, adpressed fibrils, which sometimes splits into small, polygonal, flat warts or scales. A stout, rooting mycelial cord runs from the centre of the rounded base. When wet it may easily be passed over as *Bovistella citrina*, as happened in the gathering No. 2515. I leave this species under Berkeley's name, as that is otherwise unoccupied.

Bovistella.

Bovistella aspera Lév. On bare ground in flower beds and on patana (grass land), Hakgala, common. No. 2322 (in part), April, 1907; No. 2377, April, 1907 (det. Lloyd); No. 2644, September, 1908; Nos. 4155, 4156, September, 1914; No. 4572, May, 1912; No. 5568, December, 1917.

Bovistella scabra Lloyd. With the preceding, but less common. No. 2322 (in part), April, 1907 (det. Lloyd); No. 5569, December, 1917; No. 5571, April, 1917, all from Hakgala. This appears to run into the preceding species in Ceylon.

Bovistella citrina (B. & Br.) Lloyd. Described by Berkeley and Broome in Fungi of Ceylon, No. 724, as *Lycoperdon citrinum*, from Thwaites 738 cum icone. Recently collected No. 2414, Peradeniya, June, 1907 ; No. 2515, Peradeniya. October, 1907 ; No. 2645. Hakgala, September, 1908.

Up to 4 cm. diameter, globose, or depressed globose, sometimes lacunose below, lemon-yellow, pale towards the base, with a delicate cortex of minute white spines ; usually arising from stout cord-like mycelium. Old specimens dark red-brown when moist, drying to dark shining olive, covered with minute, deep red-brown, or almost black, warts. No sterile base. Mass of spores and capillitium olive. Capillitium threads yellow-brown, stout, thick-walled, 3–10 μ diameter, branching usually at a wide angle, with occasional septa above the forks. Spores globose. 3–4 μ diameter, pale olive, very minutely echinulate, with hyaline pedicels up to 16 μ long.

When growing, this species appears entirely lemon-yellow, but a close examination reveals a very delicate cortex of minute white spines or warts. On some specimens this cortex may disappear at maturity ; in others it persists and dries in the form of minute warts. The yellow wall is 0·5 mm. thick on the immature specimens, but it becomes thin and papery when mature.

Bovistella conspurcata (B. & Br.). Described as *Lycoperdon conspurcatum* by Berkeley and Broome in Fungi of Ceylon, No. 723, from Thwaites 193 bis. The type in Herb. Kew is marked by Thwaites, " mixed with 193, I believe, in a previous gathering." There are only two specimens. No. 193 was *L. purpurascens ;* there is no mixture in the specimens of 193 in Herb. Peradeniya.

Berkeley and Broome's description is " globose, peridium minutely verrucose, here and there cracked, base small, shortly rooting ; capillitium and spores olivaceous ; spores pedicellate, 3·75 μ diameter, 12·5 μ long (including the pedicel). Scarcely an inch across. Externally resembling *L. australe*, but with differently coloured spores, which are stipitate."

The cortex is cracked into red-brown polygonal areas, some of which are powdery with minute warts. The capillitium consists of rigid, branched, yellow-brown threads 3–5 μ diameter. The spores are globose, yellow-brown, smooth, 3 μ diameter, with slender pedicels, 4–10 μ long. This species has not been collected again. Its cortex characters can be matched exactly in some of the Ceylon specimens of *Lycoperdon piriforme*, but though the latter has pedicels mixed with the spores, I have not found any specimen in which the pedicel remains attached to the spore.

Lycoperdon.

Lycoperdon gemmatum Batsch. Thwaites's specimens, No. 192, referred by Berkeley and Broome to *Lycoperdon atropurpureum* Vitt., var., in Fungi of Ceylon, No. 717, are *Lycoperdon gemmatum*. The specimens in Herb. Peradeniya are labelled "Peradeniya." It is rare at Peradeniya, but common at Hakgala and Nuwara Eliya (5,600–6,200 feet). No. 2139, Hakgala, September, 1906; det. Lloyd. No. 2371. Namunakuli, April, 1907. No. 2411, Peradeniya, June. 1907. No. 2653, Nuwara Eliya, September, 1908. No. 4571. Hakgala, May, 1912. No. 5570, Hakgala, December, 1917.

Lycoperdon piriforme Schæff. On rotting stumps, Hakgala. No. 2651, September, 1908. No. 4157, April, 1914. Nos. 5575, 5576, December, 1917. Ceylon specimens are more globose than the European form, and examples with well-developed stalks are rare.

Lycoperdon rubecula B. & Br. Described by Berkeley and Broome in Fungi of Ceylon, No. 720, from Thwaites 311 cum icone, collected at Peradeniya. Recent collections are Nos. 2412, 2413, 2415, Peradeniya, June, 1907, det. Lloyd; No. 2455, Peradeniya, June, 1907; No. 2516, Peradeniya, October, 1907; Nos. 2646, 2647, Hakgala, September, 1908; No. 2138, Pattipola, October, 1906.

Generally clustered, turbinate, or pyriform, or globose, up to 4 cm. high, 3 cm. diameter, usually stalked, white or yellowish, covered with minute spines, sometimes clustered and converging, which become red-brown at the tip. Sterile

base of large cells usually well developed, limited above by a stout diaphragm. Cortex subpersistent. Capillitium of coarse, rough, hyaline threads up to 12 μ diameter. Spores globose or subpyriform, apiculate, very minutely warted, 3–4 μ diameter. On the ground, sometimes among grass.

The specimens from Hakgala are more globose, and the sterile base is much reduced. The cortex in these specimens shows a tendency to fall off in flakes, and the red-brown colouration is not confined to the tips of the spines, but extends over the upper two-thirds of the peridium.

Lycoperdon Wrightii Berk. No. 2650, Hakgala, September, 1908. These specimens grew on a dead tree trunk. Also on a jak tree, Peradeniya, No. 4417, January, 1915; No. 5577, May, 1916.

This identification is uncertain. The specimens have the cortex of *L. Wrightii*, but the capillitium characters do not quite agree, and they invariably grow on tree trunks up to a height of 4 feet or so from the ground.

In No. 2650 the specimens are globose, about 1 cm. diameter. In one the capillitium is thick, hyaline, and septate, but in an old weathered specimen the capillitium which remains, though septate and somewhat flaccid, is fusco-olivaceous, 4–7 μ diameter. The specimens from Peradeniya are from a living jak tree, on which it has appeared periodically for the last three years, but never more than one or two at a time. They are narrow-oval, or clavate, sessile, up to 8 mm. high, and 5 mm. diameter. There is no sterile base, and the capillitium is very scanty. In the available ripe specimens the capillitium appears to have been damaged by insects, and consists of short fragments, pale olive, unbranched, septate, regular, 4 μ diameter.

The material at present available is scanty, and more is required before any definite decision is possible.

Lycoperdon purpurascens Berk. Thwaites 193, referred to *Lycoperdon pusillum* Bull., in Fungi of Ceylon, No. 725, is *L. purpurascens* in Herb. Peradeniya. Recent collections

are No. 2140, Pattipola, October, 1906 (det. Lloyd); No. 2140a, Hakgala, September, 1908; No. 2485, Peradeniya, August, 1907; No. 2983, Peradeniya, July, 1909; No. 5574, Warriapolla, January, 1918.

This species grows on rotten wood, which is permeated by rather fine cords of white mycelium. Bluish-purple when fresh, becoming paler towards the base, sometimes almost black above, covered with minute scattered black warts or short spines, especially in the upper part; when dry often marked with close-set pits and appearing reticulated. Globose, sessile, up to 2 cm. diameter, usually clustered. Mass of capillitium and spores pale purple-brown; capillitium hyaline, irregular, scanty; spores globose, with scattered warts, 3–4 μ diameter. No sterile base.

Lycoperdon phlebophorum B. & Br. Described by Berkeley and Broome in Fungi of Ceylon, No. 719, from Thwaites 194 in part. It was said to be "extus venoso-reticulatum." Berkeley and Broome stated that the spores were not yet perfect.

The type in Herb. Kew consists of two specimens, only one of which has a reticulated wall. They appear to be young specimens of *L. Gautieroides*, and this opinion is shared by Lloyd (in litt.). Massee stated (Mon. Genus Lycoperdon) that there were minute mealy warts between the reticulations, and that the spores were broadly elliptical, 5 × 3–4 μ, both of which points would fit in with *L. Gautieroides*.

Lycoperdon cepæforme Bull. No. 2321, Peradeniya, April, 1907, on bare soil in flower beds; det. Lloyd. "Very close to the European plant, but differs in its larger mouth and general aspect and habits. The essential points (cortex, capillitium, and spores) are the same" (Lloyd).

Lycoperdon echinatum P. var. **echinellum** B. & Br. Berkeley and Broome described this variety in Fungi of Ceylon, No. 721, citing Thwaites 194. In Fungi of Ceylon, No. 722, they described *Lycoperdon echinulatum* B. & Br., without any Thwaites's number. Massee (Mon. Genus Lycoperdon) did not refer to Berkeley and Broome's variety under *L.*

echinatum Pers. (p. 704), but on page 711 he listed *L. echinulatum* B. & Br., Fungi of Ceylon, No. 722, and wrote at the end of the description " (= *L. echinellum* B. & Br. in Herb. Berk.)."

I was unable to find Berkeley's specimen of *L. echinulatum* B. & Br. in Herb. Kew. Nor does there appear to be any specimen " *L. echinellum* " in Herb. Berk. Berkeley's labels are " *Lyc. echinatum* var. *echinellum*," and the specimens are consequently Fungi of Ceylon, No. 721. The type of *L. echinulatum* is apparently missing from Herb. Kew. Massee's description of *L. echinulatum* is chiefly a translation of Berkeley and Broome's. I take the specimens, Thwaites 194, in Herb. Kew and Herb. Peradeniya to be Berkeley and Broome's var. *echinellum*. It is not related to *L. echinatum*, and may stand as a species, *L. echinellum* B. & Br. The specimens in Thwaites 194 are turbinate, almost sessile, or with long stalks, from 1·5 cm. high, and the same diameter, to 3 cm. high, 1·2 cm. diameter above. In a recent collection, No. 2137, Peradeniya, October, 1906, they are more regular, ovoid or turbinate, shortly stalked, up to 3 × 2 cm., and 2·5 cm. high, red-brown, with a cortex of rather long and acute red-brown spines, often connivent in conical groups. The cortex is deciduous, separating in large patches, and leaving the surface tomentose. In young specimens the gleba is yellow, but becomes yellowish-olive when old. The sterile base is small, and woolly rather than cellular, limited by a distinct diaphragm. The capillitium threads are yellow-brown, regular, sometimes closely flexuose, firm-walled, septate, 3–4 μ diameter. The spores are globose, yellow-brown, minutely spinulose, 3–4 μ diameter. The recent collection grew on a rubbish heap, arising from white cords of mycelium.

It would appear that Massee examined Thwaites 194 for his description of *L. echinulatum*, as he describes the sterile base as dense and indistinctly cellular.

Lycoperdon fucatum Lév. was recorded for Ceylon by Berkeley in his enumeration of the species collected by Gardner, and *Lycoperdon rugosum* B. & C. was given for Ceylon in Cuban Fungi, No. 504, but neither of these records was included

by Berkeley and Broome in their Fungi of Ceylon. The specimens have not been critically examined. Massee, in his Monograph of the Genus Lycoperdon, cites Ceylon for both these species, but as his localities were in the majority of cases evidently taken from the herbarium sheets without examination of the specimens, his statements cannot be relied on.

Lycoperdopsis.

Lycoperdopsis arcyrioides P. Henn. No. 2374, Peradeniya, November, 1907.

SCLERODERMACEÆ.

Scleroderma.

Scleroderma columnare B. & Br. Described by Berkeley and Broome in Fungi of Ceylon, No. 726, from Thwaites 674, cum icone. A fairly frequent species at Peradeniya, among grass under trees.

Total height up to 4 cm. Head globose or laterally oval, usually about 2·5 cm. diameter, sometimes up to 4 cm., purple-brown or reddish-brown, even, appearing glabrous when moist, but minutely tomentose when dry, outer layer cracking into minute areolæ. Stalk up to 1·5 cm. high, 9 mm. diameter, white or yellowish, slightly tomentose, usually regular and terete, expanding gradually or abruptly into the head. In section the stalk shows a cartilaginous layer immediately beneath the epidermis, which layer is continued over the apex of the stalk, usually convexly, and separates the gleba from the stalk tissues. The central stalk tissue is white and pith-like. When cut, the central portion of the stalk turns purple and the outer layer yellow. Gleba mass purple-brown. Spores brown, globose, 8–12 μ diameter, with close-set spines, 2–3 μ long. The stalk arises from a copious mass of mycelium. The head splits up irregularly when ripe.

Scleroderma endoxanthum n. sp. Epigeal, sessile. Irregularly depresso-globose, vertically sulcate, up to 10 cm. diameter, blackish-olive, even, the surface broken into minute areolæ. Basal mycelium scanty, sulphur-yellow. Cortex up to 3 mm. thick, bright orange-yellow throughout;

gleba purple-black. Spores purple-brown, spherical, 6–8 μ diameter, furnished with long acute spines, and reticulated with narrow, often broken, bands. Dehiscence not observed. No. 5237, Peradeniya, May, 1917.

Henning's *Sclerotium vulgare* var. *novoguineense* would appear, from the description, to be close to this.

Scleroderma pseudostipitatum n. sp. Epigeal. Ellipsoid, or globose, up to 5 cm. diameter, pale ochraceous, sometimes purplish when young, even, at first smooth, glabrous, the outer layer subsequently splitting into minute innate scales. Usually stalked, the stalk up to 3 cm. high, irregular, lacunose, often compressed, sometimes an irregular mass of the same diameter as the head, arising from white masses of mycelium, occasionally wanting. Cortex internally white, becoming reddish when cut. Mass of spores olivaceous. Spores brown, globose, 8–10 μ diameter, verrucose with coarse warts, which are sometimes united in lines forming a broken reticulation. Hakgala, abundant.

In one gathering, No. 2958, September, 1908, the spores in some specimens have the warts produced into long spines, united by a regular reticulation; these spores measure 12–15 μ. In other respects the specimens do not differ from the type.

When mature, dehiscence occurs at the apex, the fungus becoming a deep, stalked cup, filled with a powdery mass of spores.

Hymenogastraceæ.

Lycogalopsis.

Lycogalopsis zeylanica n. sp. Sessile, globose or ellipsoid, 7–10 mm. diameter, usually clustered, often angled by mutual pressure, on or partly embedded in a white, tomentose, compact basal layer. At first white, with a thin, white, pruinose or tomentose outer coat, which sometimes splits into areolæ and usually disappears, leaving the peridium buff, or pale ochraceous, or grayish-white, glabrous, shining. Peridium thin, testaceous, splitting irregularly. Capillitium profuse, of diverging, pale ochraceous, or almost white, threads, extending from the base to the peridium; threads

4–6 μ diameter, rough, often united into strands. Spores globose, 3–4 μ diameter, or oval, 4 × 3 μ, pale ochraceous in mass, hyaline, coarsely warted or spinulose.

Peradeniya, August, 1906 ; November, 1906 ; November, 1917.

Hydnangium.

Hydnangium carneum Wallr. var. **purpureum.** Hakgala, December, 1917. Subglobose or ellipsoid, white below, pinkish or pale purple-red or pale purple-brown above, often vertically streaked. Gleba flesh-coloured ; spores very pale yellow, almost hyaline, spherical, 10–15 μ diameter, thickly covered with close-set conical spines, 1·5 μ long.

Rhizopogon.

Rhizopogon flavum Petch. Hakgala, January, 1914 ; December, 1917. Further specimens show that this species attains a length of 5 cm. with a breadth and height of 3 cm.

Hymenogaster.

Hymenogaster zeylanicus Petch. Hakgala, May, 1913 ; December, 1917. Sita Eliya, December, 1917.

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